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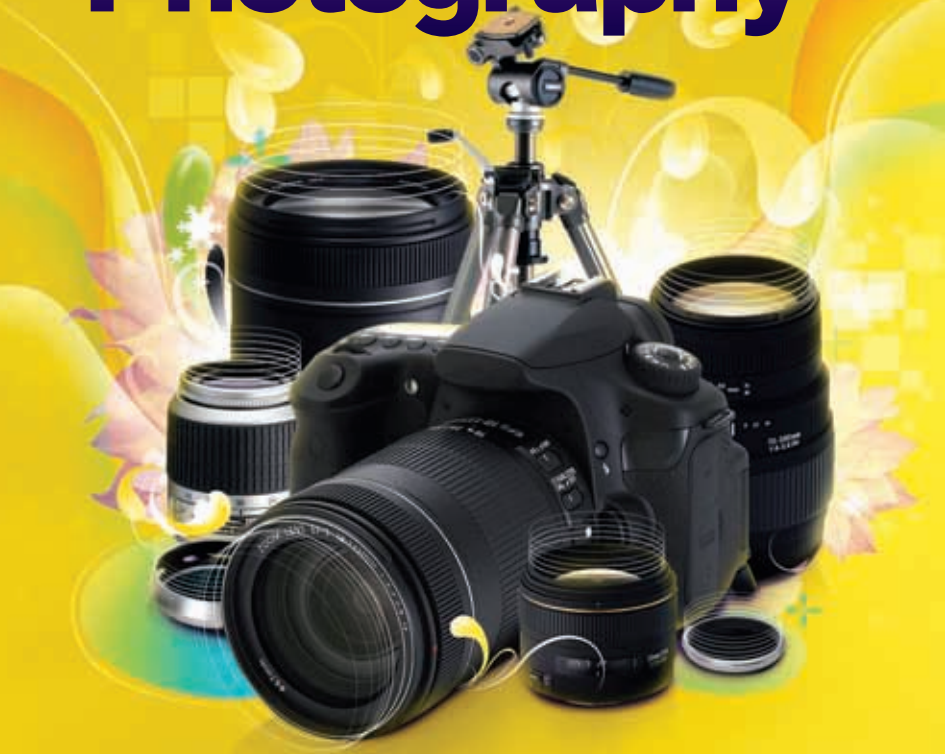
digit FastTrack

YOUR HANDY GUIDE TO EVERYDAY TECHNOLOGY

to Digital Photography



- Introduction to dSLRs
- Aperture, shutter and ISO speeds
- Camera lenses demystified
- Exploring filters
- Flashes in photography
- Compact dSLRs
- Tripod and monopod
- Post processing
- Cellphone photography
- Online resources

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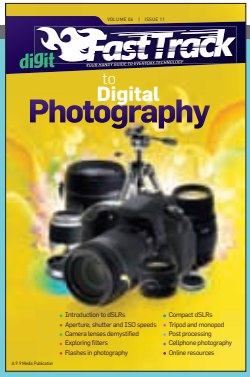


COVER DESIGN SHIGIL N

INTRODUCTION

A picture is worth a thousand words
— Fred R. Barnard

Change how you see the world

Most trigger-happy clickers would get their knickers in a twist over whether Photography is a science or an art. Most, though, would agree to meet midway and define it as a complex yet elegant homogeneous mix of both. Over the centuries, man has tried to capture what he sees, either by scratching on cave walls with stone equipments, or by flicking out his iPhone.

Technology has made photography so drastically popular thanks to ease in consuming this technology that anyone with an urge to capture the moment can do it within the blink of an eye. Cameras in all price ranges with very impressive feature sets flood the market, and it's a brilliant time to get into photography if you've been considering it. This Fast Track will help you take better photographs with your existing photography gear exploiting its fullest potential and help select the right equipment if you don't own this already. We'll be dealing with topics in photography with a strong bias towards the digital medium. We'll cover technique, equipment, hardware and even online resources for social sharing of your work.

You're first acquainted with a dSLR and its advantages over a traditional point and shoot. Then, we move on to explain the three fundamental pillars of technique in photography a.k.a ISO, aperture and shutter speed. With a good grasp over these basics, it would be smooth journey in the lens section, where you learn why the most expensive isn't always the best and which should be the second lens you buy.

Hollywood photography directors and the most respected among them have a secret arsenal – photographic filters. There's a full section dedicated to their usage and importance. We then move on to technique, since a monkey on a typewriter would still not be able to author the bible. Here, we deal with an array of topics ranging from exposure and depth of field control to lighting and focusing, helping you take better pics with every gear that you use and own.

Flash in a camera is a double-edged sword. Either it can help you get shot in the foot or create a masterpiece. Here, we deal with this complex topic and explain via examples how you should use flash in full sunny conditions, ironical as it may sound, or how to use an off-camera flash.

If you can't get enough light into the frame, you have to stabilize your camera, and the tedious but best way to do this is to use a tripod or its smaller cousin a monopod. We'll explain the kind of scenarios they're best suited for.

Moving towards the equipment size, if the size of the dSLR scares you or portability is an issue then recent advances in manufacturing of mirrorless cameras might save your day. We have a whole chapter dealing with their advantages as well as a quick look into the reasons why they could be EVIL.

Then, we take a quick look at post processing images to make them even prettier and showing the world and your friends your prized creations. As someone said, the best camera in the world is the one that is on you, we have a section covering photography via cellphone cameras given how omnipresent they are these days.

Hope you enjoy reading this and and have even more fun applying all the gyaan that you gain here. And if you push some changes on flickr, do send us a link, we'd love to get reader feedback. Happy clicking.

INTRODUCTION TO dSLRs

In this section we help you understand the innards, functioning and concept of dSLRs

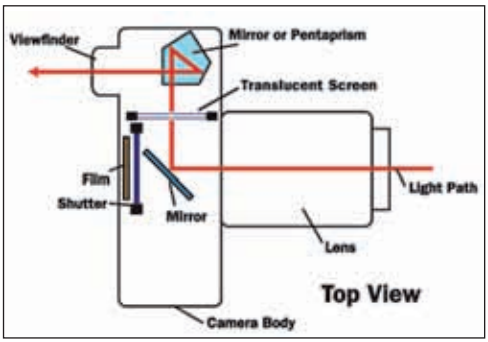
What dSLR is

The acronym dSLR stands for digital single-lens reflex camera. The main advantage and difference of this type of camera over simple point and shoot cameras arises in the way the photographer sees the scene via the camera. SLR cameras have a wysiwyg (what you see is what you get) approach, where the viewfinder and the photographer see the exact same thing as the final capture. This is also its biggest advantage over simple point and shoot cameras, where the viewfinder is merely a window in the camera body giving an inaccurate and rough estimate of the final output. This might sound like a minor difference, but in reality, makes SLRs a photographer's dream, and the main reason for their ever-increasing popularity.

To understand how an SLR camera achieves this, consider the following.

Light enters the camera's body, hits the inclined mirror in between the lens assembly and the sensor of the camera and is transferred to the penta-

prism (or penta-mirror). When we see through the viewfinder, we see the light reflected by this penta-prism, which focuses it, so as to be directly observable via the photographer's eye. As you press the shutter button, the viewfinder is blocked for an instant (called viewfinder blackout). This happens because the inclined mirror reflecting the lift swings upwards, allowing the light that comes in through the lens to hit the sensor directly thereby exposing it and capturing the exact image. While this process may sound a tad too long, any entry-level SLR will be able to achieve the entire operation three times a second or more.



Credits: HowStuffWorks

dSLR Internal

This simple yet very effective accuracy in composing pictures from the operative difference between SLRs and point and shoots is actually responsible for their preference by most serious photographers or even photography enthusiasts, resulting in an ecosystem of lenses and accessories around them. Infact, interchangeable lenses are one of the biggest draws towards using an SLR. From even advanced point and shoot cameras, it's often impossible to get such superior results as can be had thanks to the ability of SLRs to employ an array of custom lenses which serve specific needs instead of a single, general purpose.

While point and shoots use contrast-detection technology for auto-focusing, SLRs often employ phase-detection technology – a much faster method. Though this allows for less "focus searching", it needs a special sensor in the optical path which, though present in SLRs, is missing from point and shoots. P&S cameras are slower in some implementations because they instead have a main sensor that creates a preview on the electronic viewfinder using the contrast-detect method.

Not just in lenses and sensors, some of the biggest differences of the two cameras lie in their build types. Despite the complex optics and more elaborate internal designs, SLRs are typically the more rugged and modular

ones by a sizeable margin. For most point and shoots, size and portability are the defining parameters, giving limited options to the manufacturers with their biggest concern being the ease with which they can fit into a tiny bag or pocket and quickly be taken out for a quick click. On the other hand, with SLRs, stability and sheer ruggedness are given far more importance, irrespective of the big dedicated bag you'll need to haul them around in.

Difference between an SLR and a dSLR

Superior modularity is a common feature in most SLR cameras, especially towards the higher-end, comprising typically of three sections: the lens assembly, the camera body and the Image Back. In simple analog cameras, your roll of film (generally a 35 mm film) forms the image back, while in SLRs this roll is replaced with electronic sensors. These sensors are responsible for converting light into electronic information which can be stored and read on a computer. As explained earlier, the larger size with lesser constraints in the design of SLRs, as compared to point and shoots, allows them to make use of physically larger sensors, making a huge difference in image quality – the main reason why people pick an SLR camera over simpler point and shoot alternatives.

Which one to choose

Image sensors

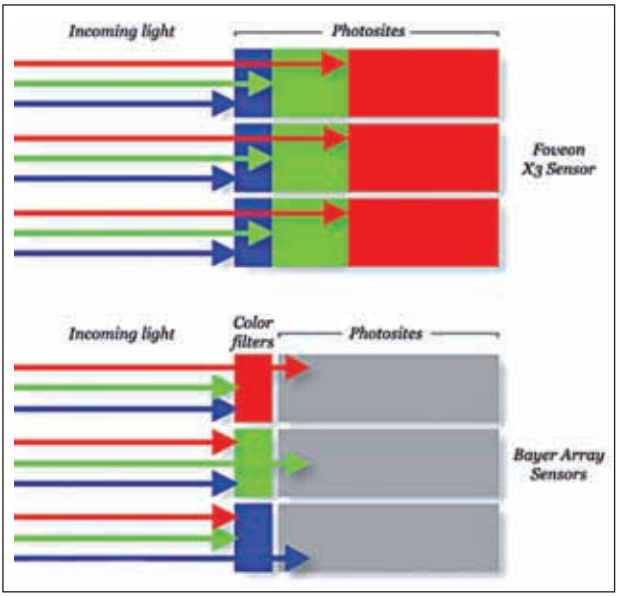
Clearly, image sensors are of extreme importance in SLRs. Next, we'll take a quick look at the technology used there. Today, most digital still cameras use either Charged Coupled Device (CCD) or Complementary Metal Oxide Semi-Conductor (CMOS) chips. Both types accomplish the same task of converting the captured light into electrical signals. CCD technology entered the market earlier than CMOS, yet most small sensor cameras (up to full frame 35 mm) make use of the CMOS chips. On the other hand, the medium or large format cameras with the larger sensor are almost all CCD still. When light strikes the CCD chip, each photo sensor holds it as a

small electrical charge which is converted one pixel at a time to voltage, and later converted into digital information. A CMOS imaging chip has more functions than this, employing the "active pixel sensor" which allows for additional circuitry to be included on the chip itself for the conversion of voltage into digital data.

Both technologies manage to produce the highest image quality though, with no obvious advantage in one over the other, but the basic difference is that the CMOS integrated circuits have potentially more processing functions on the chip itself. On the downside, when a CCD sensor is overloaded, the bright light may cause vertical smudge, though high-end frame transfer ones have gotten rid of this problem. On the other hand, CMOS sensors have rolling shutters, typically undesirable on their own. On the plus side, CMOS chips are not only more economical to manufacture but also tend to use less power, generate less heat and provide faster read-out of the electrical signal data, while providing additional signal processing such as noise reduction on the chip itself. This explains to some extent why CMOS-chipped cameras tend to provide more highly processed, less "raw" data than the CCD chips normally found in medium format backs. In comparison, CCD is a more mature technology providing equal results as far as image quality is concerned. There are hybrid sensors, using components of both, CCD and CMOS chips in the research phase that can potentially harness benefits of both technologies in the future.

Let's look a bit into some popular colour filter technologies commonly used beginning with U.S. Patent Number 3,971,065, belonging to Bryce Bayer, received in 1976, leading to present day Bayern pattern filter mosaics. His terminology meant calling the green photo-sensors luminance-sensitive elements and the red and blue ones chrominance-sensitive elements. To mimic luminance as perceived by the retinas of human eyes, he used twice as many green elements as red or blue. In our eyes, several sensor elements, sensels, pixel sensors or simply pixels, responsible for luminance perception, use M and L cone cells, and after some interpolation, sample values as perceived by them become image pixels. Data from a single pixel can't be used on its own to determine colour since each pixel is filtered to record only one of three colours. Various demosaicing algorithms are put in place to interpolate groups of complete red, green and blue values for each point in order to obtain a full-colour image.

Almost all digital cameras use the Bayer filter only, though there exist common alternatives such as the Cyan-Yellow-Green-Magenta (CYGM)



A visual representation of the difference in arrangement

filter or the Red-Green-Blue-Emerald (RGBE) filter. Another option is the Fovean X3 sensor, where demosaicing is not required. It's a CMOS sensor that instead of forming a mosaic out of them layers red, green and blue sensors vertically, forming an array of photo-sites, each of which consists of three vertically stacked photodiodes, organised in a two-dimensional grid. The signals from the photodiodes are then processed to extract data that provides the three additive primary colours: red, green and blue. Less popular than the Bayer filter image sensors for digital cameras, the Fovean X3s differ in operation. Every photo-site in Bayer sensors consists of a single light sensor, be it CMOS or CCD, which is exposed to only one of the three primary colours due to filtration. This raises the need of using an interpolative process like demosaicing to get the full-colour image, where each photo-site's output pixel is assigned an RGB value which depends on the levels of red, blue and green reported by the nearby photo-sites. On the other hand, a Fovean X3 combines the output from all the stacked photodiodes at each of its photo-sites to create a final RGB colour result for every site.

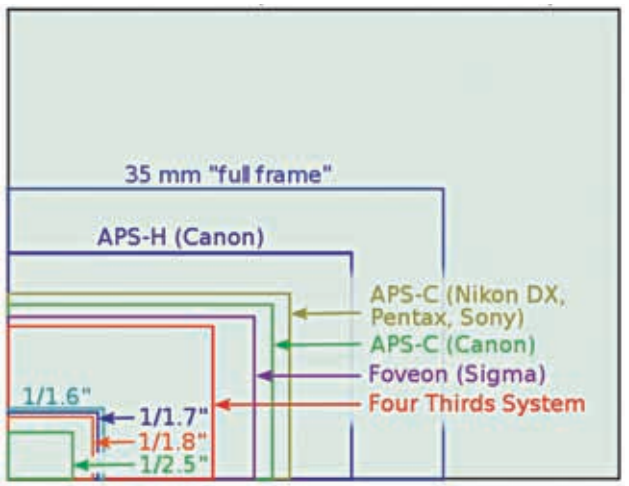
And it's this simple operational difference which leads to consequences making one option more preferred than the other for a particular kind of shoot. The absence of demosaicing in Fovean X3 has its own advantages.

Firstly, it leads to the removal of colour artifacts popularly called "coloured jaggies" associated with this process. Also, since very little aliasing occurs, there's no need for anti-aliasing filters, as are necessary in Bayer sensors. With the help of micro lenses, photodiodes for a particular colour integrate the optical image over a region the size of spacing of sensors for that colour. Though this removes the colour artifacts, colour separation by silicon penetration depth leads to increased cross contamination in between colour layers, in turn compromising colour accuracy.

Another advantage with the Fovean X3 is that the camera manages to detect a higher portion of photons entering it than would be possible with a mosaic sensor, in which two colours are absorbed by each of the filters overlaying a photo-site so that a single primary colour passes through. This causes a significant reduction in the total amount of light gathered, destroying critical information regarding the colour of the light that strikes on each sensor element. Though there's a higher light gathering ability in Fovean X3, the different individual colours don't receive a sharp response from the separate layers raising the need for removal of common mode signals through "matrixing" of the colour indicating information in the sensors' raw data. Though this produces the colour data within appropriate colour spaces, it also enhances noise in low-light scenarios.

Size

Most SLRs have sensors the size of a frame of APS-C film, with crop factors around 1.5-1.6. Olympus and Panasonic though are notable exceptions to the popular four-thirds system of cameras, as they employ smaller sensors with typical crop factor values around 2.0. Full-frame sensors around the size of a 35mm film frame are also used by a few professional dSLR cameras. Now you may have noticed that markets are full of marketing terms describing sensor formats such as "full frame" digital SLR format, which means that the dimension for this particular sensor nearly equals that of 35mm films (that is 36 mm × 24 mm). Or say Canon's APS-H format, which indicates high-speed pro-level dSLR with crop factors 1.33. APS-C refers to a similarly sized range including Nikon DX format, Pentax, Fuji etc among others with crop factor 1.5 and even entry-level dSLR formats from Canon with crop 1.6. As compared to an APS-C sensor, a full-framed sensors' production costs may be upto twenty times higher. On a generic 8-inch silicon wafer used for manufacturing, 112 APS-C sensors can fit in, while only around 30 full-frame sensors can be accommodated on the same sheet. Also the



Medium format (Kodak KAF 39000 sensor): Visual comparison of various image sensor formats

large area for contamination per component leads to a further sizeable reduction in yield. Moreover, a full-frame sensor in its photolithography stage needs three different exposures, each requiring separate masks and quality control steps. On the other hand, with a single mask the largest size possible is the APS-H, making it a common option to keep production costs under control and manage better sufficient yields. Slight variations within a nominal format are common as semi-conductor fabrication and processing are a continuously evolving domain. Also, third-party foundries are often used to source in sensors.

Crop factor

Since most digital camera sensors are smaller than film, the image as seen from these cameras is actually created from a smaller area than film. For digital sensors, the Crop Factor relates the ratio of the dimensions of this imaging area in cameras compared to a reference format. In effect, it shows a smaller area for an image constructed from the same lens but smaller sensor. That's why it's called a crop factor – implying that the lens' image is cropped in comparison to a 35mm film frame by a given factor. Because of this crop, the effective field of view (FOV) is reduced by a factor proportional to the ratio between the smaller sensor size and the 35mm reference film format.

A general rule in cameras to be remembered is that multiplying a lens' focal length by a camera's factor gives the focal length of a lens which, when

used on a full-frame or 35mm film camera, has the same angle of view as that lens does on that digital camera. For example, a 100mm lens on a 1.5x factor camera shows the same area of view that a 150mm lens would show on a 35mm film or full-frame camera.

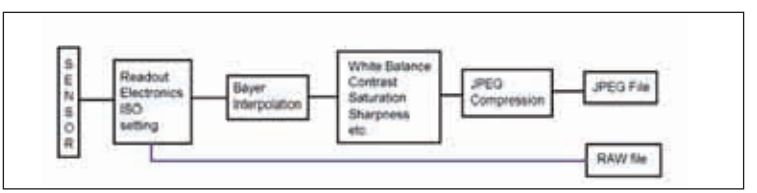
A commonly asked question is "what camera sensor resolution is suitable for me?" And a quick answer to this is it all depends on your purpose or use of the images generated. For posting online or for newspaper reproductions, you can pick any current dSLR for sufficient resolution. When you'll need to crop for details or need larger print sizes or clearer pictures say, for magazine printing, somewhere around 8 megapixels will be a good starting point. dSLRs above 10 megapixels will do the trick for fine-art landscape shutterbugs and others seeking maximum details. This is a generic answer for generic use but if you have a specific target size in sight, there's a commonly followed method you can apply with simple math. Let's say you want to take an 8 x 10 inch print on an inkjet printer. Firstly, know the required output resolution; let's assume this to be 300 pixels per inch or greater. Now, multiply the needed output resolution by the linear dimensions of your final print. In this example that equals 8 inches x 300 PPI = 2,400 pixels needed for the vertical dimension and 10 inches x 300 PPI = 3,000 pixels for the horizontal. Now multiply the horizontal and vertical, here 2,400 x 3,000 = 7,200,000 or 7.2 megapixels. It's advisable to take an upper margin here so that you can crop a picture later without compromising on resolution. Say we estimate 20 percent of a photo is generally cropped, so we add that to our required value, giving us 7.2 x 1.2 = 8.64 megapixels. Thus approximately a good minimum resolution will be something above 8.5 megapixels.

While caring for sensors, the most common problem is dust. Whenever you change the lens in your dSLR, make sure you don't get any dust on the sensor as this can result in bad pixellation or too much noise. At best, you can cover up for it by re-touching the images during post processing; at worst, you can seriously mess up your camera's internals. Reasonable care while swapping lenses and not too rough handling of your camera is sufficient to prevent dust from being an issue for you, unless of course you're planning to shoot in sandy or particulate heavy terrain. For everyday use don't worry, because a combination of anti-dust technologies are present today in almost all SLRs, like vibrating the sensor on startup to dislodge any settled particles.

Image formats – RAW or JPEG?

Ah, this is a question every photographer has faced at some point or the other. Countless discussion threads and references cover this debate, concerning issues ranging from basics like size and quality to advanced technicalities like colour bits per channel, compression etc. In simple terms, RAW data is the output from every original red, green or blue sensitive pixel of the image sensor, after being read by array electronics and having passed through analog to digital converters. In comparison to storing data as a JPEG file, RAW file data goes through the Bayer interpolation filter and is modified as per set parameters like white balance, sharpness etc before being subjected to JPEG compression and then stored, ready for viewing and printing immediately after the shot. File sizes are smaller in JPEG and can be interpreted by many programs giving it a basic advantage over RAW but a counter-effect is the loss in quality proportionate to the compression. The exact way in which JPEG images are processed within the camera varies from model to model, depending on the camera setting for parameters like colour temperature and exposure. It also involves internal processing for characteristics such as contrast, brightness, noise reduction and sharpness. You may come across terms like "dynamic range" commonly thrown around when discussing the RAW vs JPEG topic. This is simply an indicator of the amount of tonal range detail from the darkest shadows to the brightest highlights. Because of the image compression when storing JPEG, a significant amount of initial information and detail is discarded which can't be recovered later, leading to reduced dynamic range in JPEGs as compared to RAW.

A RAW file is not exactly an image per se, and to view it typically in proprietary formats requires a special (and commonly available) software. Most notably, it's an uncompressed file. What this means is that a 10-megapixel camera produces a 10MB RAW file which has the complete data from the camera's sensors without any loss and with a high dynamic range.



Raw vs jpeg

This type of a file usually has a flatter, sort of washed out look with lower contrast and sharpness, and is unsuitable for printing directly from the camera without post processing. Despite these apparent drawbacks, there are lots of areas where RAW images are the preferred choice. When you're constantly shooting fast moving situations instead of photographing still sceneries or on-set shoots, especially during journalistic shooting, RAW is almost critical because nobody can possibly shoot the perfect exposure every time with continuously varying lighting, subjects, backgrounds etc. Shooting RAW in such situations allows for quick clicks retaining enough information to fix possible exposure issues in post. Thus for shutterbugs covering weddings, events etc where a smile or a teardrop can't wait till you get to the correct settings, it's quite essential to be shooting in RAW. Also, for landscape photographers shooting nature, or rather any scene that has significant dynamic range, again in order to have added post production flexibility to burn the highlights while dodging the shadows or in any way to properly tone up the image without compromising on quality, RAW images are more beneficial.

On the other hand, say you need the images for display or have to use them immediately, you'll have to go with JPEG then. If your use will be instantly after clicking but you still want flexibility for post production effects, you may want to try the RAW + JPEG mode, so you can enjoy both benefits. Of course in that case be prepared for some extra crunch on your memory card! Identifying your need for the image will always help you decide better. Say, you plan to post the photos online, you can do this with a simple 500 pixel JPEG image on your blog instead of taking up volumes in RAW as there may not be loads left to do in post production. For most photography enthusiasts, clicking pics may well be a personal passion where you shoot moments around you to capture cherished memories forever; as such you won't necessarily require fancy tonal ranges or complex post production for every event in your personal life. It's thus better to use JPEG for these casual everyday captures. The simple rule here is that you need not be using large disk spaces or spending crazy amounts of time processing images when the differences are going to be negligible and go unnoticed.

Battery types

Usually you'll find batteries in most SLRs to be less powerful than even point and shoots. Many Pentax digital SLRs today run on four simple standard AA batteries. Variety in battery types is huge today, and common ones

include Lithium-Ion (Li-Ion) rechargeable ones and Nickel Metal Hydride (Ni-MH) batteries. Li-Ion batteries can store charges for long durations at a time and though they may seem to be a more expensive option to invest in, they last much longer than most other types. Ni-MH batteries are the most common replacement for standard AA, since they can be recharged each time. Another popular option available is CR-V3 batteries, an equivalent to 2AAs, which come in both rechargeable and non-rechargeable versions. A small tip to help you with rechargeable batteries is to look for the milli-Ampere-hours (mAh) number. This is an indicator of how long the battery will last when fully charged, with a larger number implying more run time when the camera is in use.

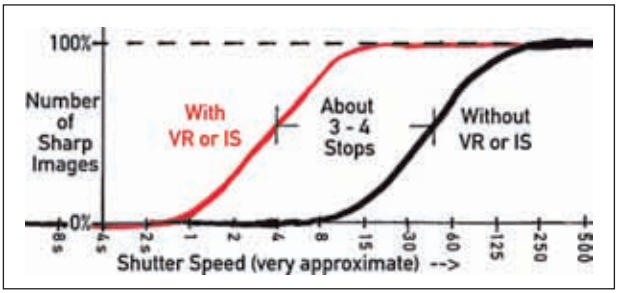
Investing in a decent battery grip will also prove fruitful if you intend to click photo after photo on a regular basis. Multiple Li-Ion or AA batteries can be stored in these optional compartments attached usually to the bottom of the camera body. Not only do they give prolonged power to the camera, battery grips also generally have a shutter release button and often include a similar set of additional control devices as are present on the camera body, which make operating the camera much easier for taking portrait photographs while holding the camera vertically. Battery grips may be slightly on the expensive side and could even add to the weight of a digital SLR, but they could prove to be very useful for photographers who click a lot of portraits by avoiding wrist strains.

Special features

Image stabilisation

Some version of this technology, even though called by different names, exists in all dSLRs today. Be it Canon's Image Stabilization (IS) or Nikon's Vibration Reduction (VR), both are essentially the same thing, allowing for much sharper images in dim light or with long lenses. While for still subjects like in studios or setups both IS and VR work perfectly fine, when shooting moving subjects like sports or kids, VR doesn't have much use as it only helps reduce camera motion and can't stop subject motion. They basically provide you with an option to get rid of the blurring effects from hand holding and even help replace the tripod for making sharp photos. They can also be employed to achieve better motion panning shots, wherein VR blurs one side while stabilising the other.

Don't confuse or equate these technologies with the term "anti-shake" popularised by makers who wrongfully use it even when they're merely



Courtsey: Ken Rockwell

Why you should use Image Stabilisation

giving you increased shutter speed by boosting the ISO, which you may as well do on your own by tinkering with the settings. In contrast, actual IS and VR use motion sensors before as well as during the exposure of the photograph to detect even the slightest of movements, after which to counteract this motion various devices are used to shift the optical image, which is actually moving the image sensor, ensuring that the image stays more stable during exposure. If you're using tripods, you should shut the VR off, which is automatically deactivated by many smart VR systems themselves when they figure out that you're on a sturdy tripod.

Though it started fairly early, there exists this body of opinion which contests that optically stabilised lenses are capable of better stabilisation than moving sensor body-based systems. The basis of this claim is straightforward, since each stabilisation hardware is dedicated to a single lens, the performance parameters can be tuned to that particular lens. Also large amplitude shifts prove easier to fix, which result from large image shifts due to very small displacement of an optical element. Irrespective of whether you're using the latest autofocus super-zoom or a year-old manual focus lens, body-based stabilisation is equally effective in all situations, and this is also its biggest advantage. And that's not all – you can even manage to stabilise wide angle and normal primes!

Geo-tagging

Foolography, a German company, has more to offer than just the cool name really. They amaze you with an interesting geo-tagging solution which uses the GPS connector on Nikon cameras. It has a tiny Bluetooth receiver named unleashed, which can work with all Bluetooth-compatible GPS receivers to directly insert the location coordinates into the EXIF header of the digital camera files. Though using the GPS has its own set of problems – like

excessive drainage of power due to exhaustive processes such as locking onto satellites, talking to them and then processing the answers. Direct GPS support in digital cameras can seriously hamper performance if it keeps searching for signals, and this is where Unleashed steps in. It automatically uses the last locked coordinates instead of bogging the battery further down. Little wonder then that most dSLRs don't have these technologies built in. A popular alternative here are clip-on geo-tagging cards like the little Eye-Fi card that gets around the problem by using triangulation to estimate its position based on wireless access points instead of relying on satellites. Another example of this technology is the Kato, which sends the raw data to the computer and makes the unit less power hungry, smaller and quicker.

Live View

Live preview is not as typical a feature in dSLRs as it is in point and shoots. The optical viewfinder still is the primary means of framing a picture and previewing it before the actual click. Infact, the first dSLR that had a live preview came as late as 2004 – Fujifilm FinePix S3 Pro. Several cameras, such as the Canon Power Shot G Series, had real-time exposure simulation before live previews became available in dSLRs. This allows for an easier path to achieve the desired exposures in still and video photography quickly, especially in manual mode. Yet, quite a few models still lack this real-time preview feature, forcing the photographer to rely on more rudimentary focusing means. A hundred percent frame coverage is still missing from even those dSLRs that do employ standard phase detection sensors for focusing. Live histograms for colour or tone balance are also on offer in a few high-end live preview capable digital SLRs capable of real-time exposure simulations, where the instant that exposure adjustment is made, this graph is changed in accordance. Live depth of field (DOF) preview and even indications of overexposed areas in images may also be included in more advanced systems.

APERTURE, SHUTTER SPEED AND ISO SPEED

A look at the three sides of the exposure triangle, and understanding how to use them effectively

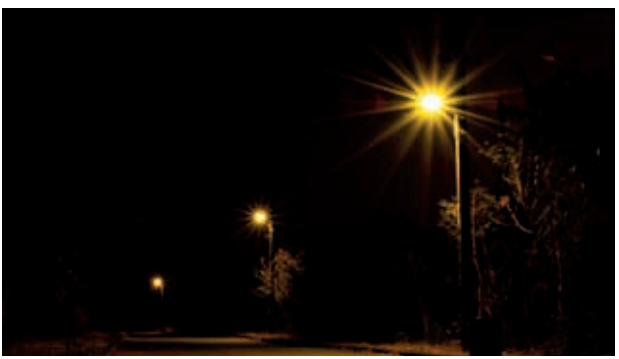
A solid understanding of camera lenses will help you be more creative and have superior control over digital photography. When light is incident on the camera lens it passes through a variety of lens elements, each of which has a role in directing its path so as to recreate the image as accurately as possible. For anyone with the slightest interest in photography, these lens elements are the first step to get right. Ever felt the need to know a bit more about words like “exposure”, “ISO speed”, “aperture”, “shutter speed”, but while looking for explanations got bogged down by further jargon? Well, here we’ll try and explain what they mean in simple terms, the way it should be. .

Consider the task of making a dot on a paper with a sketch pen. Now the size of the dot will depend on the length of time you keep the sketch pen in contact with the paper (shutter speed), the size of the tip of the pen (aperture), as well as the absorbing power of the paper (ISO speed). Sum up all these factors and you get the net "exposure" that your paper had with the sketch pen. All of these are valid for both, digital and analogue cameras. Now, let's get into a little more detail about these.

Aperture

Aperture refers to the lens diaphragm opening inside a photographic lens, and aperture range in a camera lens regulates how much the lens can open or close down; hence it controls the amount of light that passes through. Values of aperture openings are represented in terms of "f-stops", that you must have seen mentioned many times as f2.6, f5.8, f22 etc, These numbers quantitatively describe relative light gathering area, so remember that smaller this value, wider will be the opening. "Faster" lenses are those with larger aperture as for given values of ISO speed, the shutter speed can be made faster here for the same exposure. On the other hand, a smaller aperture will give better depth of field, meaning that objects over a wider range of distance can be in focus. To decide upon the required f-number for your use, you should have a good idea of the surroundings, subjects and desired look of the images captured.

For instance, large apertures with narrower depth of field or faster shutter speeds are preferred for portrait or indoor theatre or sports photography which allow you to isolate the subject from the background. Say you want to shoot night or low-light photography, lenses with larger maximum apertures



Courtesy: Subiet@Flickr

Sun Stars being formed at f/22

will provide significantly brighter viewfinder images while also giving you faster and more accurate auto-focusing in such scenes. Minimum aperture lenses find very limited need because of the photo blurring from lens diffraction. Mostly in cases when extreme depth of field is desired, smaller apertures and larger f-numbers find use. Also some zoom lenses on dSLRs and even compact digital cameras give you a list of maximum apertures depending on how far you wish to zoom in or out, thus it's important to note that aperture ranges mentioned here refer only to the range of maximum aperture rather than the overall range.

For the sake of completeness, we must mention that an aperture opening (iris) is rarely a perfect circle, due to the presence of 5-8 blade-like lens diaphragms.

Shutter speed

This indicates the time that the shutter (internal cover of lens) opens up to let the light reach the sensor. Higher the shutter speed, smaller is the duration and lesser the light that reaches the sensor (relate to the time of contact of sketch pen and paper). It simply indicates how long the incident light will be permitted to enter the camera and hit the sensor. Note that shutter speed and exposure time are conceptually the same, with longer exposure time implying slower shutter speed. Not only does it affect exposure but variations in shutter speed can change the way movement appears in the shot. For instance, at sporting events to freeze fast-moving subjects, very short shutter speeds are beneficial. On the other hand, if you want a more artistic effect by introducing additional motion blur in moving subjects like in a waterfall, longer shutter speeds give you beautiful shots.

Courtesy: Subiet@Flickr

Extremely high shutter speed to capture half burned head of a matchstick

The correlation between shutter speed and exposure is simply 1:1. Typically, exposure values (EV) are used as units to measure the exposure quantitatively. Sometimes called stops, these represent halving or doubling of the exposure. Also, multiple combinations of shutter speed and aperture can give the same exposure: halving the shutter speed doubles the exposure (1 EV more), while doubling the aperture (halving the number) increases the exposure by a factor of 4 (2 EV). For this reason, standard apertures differ by √2, or about 1.4. Thus an exposure with a shutter speed of 1/250 s and f/8 is the same as with 1/500 s and f/5.6, or 1/125 s and f/11. Keeping the shutter speed to something like in the range of 0.001 second can absolutely freeze fast moving, up close motion while 1 – 30+ second shots can be used for specialty night and low-light photos on tripods.

ISO speed

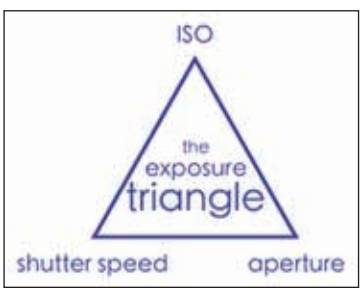
This parameter is a measure of the sensitivity your camera has to incoming light, and like shutter speed, it too correlates 1:1 with the increase or decrease in exposure. In fact, the ISO settings in cameras are a carryover from the film era of photography when ASA speeds were popular. During that time, film rolls used to be rated at 100, 400 or maybe even 1,600. This number referred to the film's light sensitivity, for higher sensitivity, you had to pick a higher value. In its present form, the ISO bit is from the standards for film sensitivity (not really an acronym as such but named so by the International Organization for Standardization), and the number refers to its rating. While film has a static rating, a single digital camera can allow you to capture images at several different ISO speeds by simply amplifying (or diminishing) the image signal in the camera. However, note that as the signal is amplified, so is the image noise, thus unlike aperture or shutter speed, higher ISO speeds dramatically increase image noise and are almost always undesirable, much like the "grainy" effects on films with increased sensitivity.

With digital cameras, common ISO speeds include 100, 200, 400 and 800, though cameras permit lower or higher values also. Effectively, what this implies is that a photo at, say, ISO 200 will take half as long to reach the same level of exposure as one taken at ISO 100 provided all remaining settings are the same. ISO speeds in the range of 50-200 typically produce acceptably low noise images in compact digital cameras, whereas with digital SLR cameras, an acceptable range can well be from 50 to 800 or even higher. Now you may wonder that since you can easily change ISO settings with every shot taken, surely you could work with settings like 297 or 839 if you wanted. Well, in theory, yes. You could pick any

number you wish to work with, but unless you want to end up experimenting and testing almost all the time, this is highly unadvisable. A complete exposure consists of the perfect aperture, shutter speed and ISO setting. Since you can alter each individually, the possibilities for trying out new combinations are endless, so it'll probably be smarter and less confusing to keep certain settings like ISO under limits.

When choosing the ISO for a shoot, remember that it will also impact your aperture and shutter speed needed for a well-exposed shot. Say, you increased your ISO to 400 from 100. You'll notice that now you can shoot at higher shutter speeds or smaller apertures. Thus, picking a good ISO can be tricky. Important factors to consider here include how well the lighting is, is the subject moving or stationary, whether you'll be using a tripod, how much noise levels are acceptable to you and so on. Let's consider two basic extreme conditions - on one hand, a pretty low ISO will work for you with negligible grainy effect if you have a stationary, well-lit subject that you click with a tripod. Similarly, if it's dark and you're not using a tripod for a moving subject, it's advisable to increase the ISO so you can still expose the shot well even at faster shutter speeds. Of course, a tradeoff of this higher ISO value is increased noise in images.

Now that you know what different terms mean in photography jargon, you should go right ahead and experiment with your settings to practically gain some intuition on how images will look with different combinations of each. A popular reference and an interesting read for enthusiasts is the book Understanding Exposure by Bryan Peterson where he elaborates the "exposure triangle" and explains how you can play around with these three settings: aperture, shutter speed and ISO values to achieve that perfectly exposed shot. Each of these aspects of the triangle relate to light and the way it enters and interacts with the camera, and more importantly how the terms are correlated and can't be isolated without affecting the other parameters. Good control over these settings will enable you to bring more character and vibrancy into otherwise flat and just acceptable shots.



The exposure triangle

CAMERA LENSES DEMYSTIFIED

A guide to understanding camera lenses and choosing the right kind of lens

Let's now look at the various configurations, options and features available in modern camera lenses.

When you first look at the camera lens, the two most important parameters assigned to it are the focal length and the aperture range. Let's talk about the focal length first.

Focal length

The focal length of a lens relates the view field of the lens, and therefore dictates how much the subject will be magnified for a given photographic position. Wide angle lenses have short focal lengths, while telephoto lenses

have longer corresponding focal lengths. So when you zoom in, you increase the focal length and when you zoom out, you decrease it.

The focal length (f), the distance from the front nodal point to the object to be photographed (S1), and the distance from the rear nodal point to the image plane (S2) are then related by:

$$\frac{1}{S_1} + \frac{1}{S_2} = \frac{1}{f}$$

As S1 is decreased, S2 must be increased. For example, consider a normal lens for a 35 mm camera with a focal length of f = 50 mm. To focus a distant object ( ), the rear nodal point of the lens must be located a distance S2 = 50 mm from the image plane. To focus an object 1 m away (S1 = 1000 mm), the lens must be moved 2.6 mm further away from the image plane, to S2 = 52.6 mm.

As you would have gauged by now, apart from determining the view field, focal length also relates to the magnification of the image. A lens with a focal length about equal to the diagonal size of the film (about 35 mm) or sensor format is known as a normal lens. Normal lens ensures that the view field matches the typical view field of the human eye. As in, the objects perceived via the view field would match how a human eye would see the scene. For full-frame 35mm-format cameras, the diagonal is 43 mm and a typical "normal" lens has a 50mm focal length. A lens with a focal length shorter than normal is often referred to as a wide-angle lens (typically 35 mm and less, for 35mm-format cameras), while a lens significantly longer than normal may be referred to as a telephoto lens (typically 85 mm and more, for 35mm format cameras).

Courtesy: Nikon

The difference in view at different focal lengths

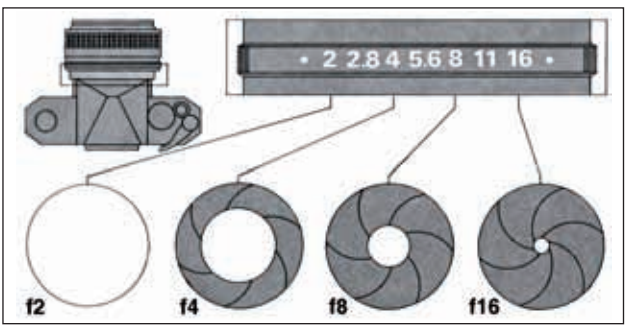
To be very strict about the terminology use, the long focal length lenses are truly "telephoto" only if the focal length is longer than the physical length of the lens, but the term is often used to describe any long focal length lens.

Due to the popularity of the 35mm standard, camera–lens combinations are often described in terms of their 35mm equivalent focal length, that is, the focal length of a lens that would have the same angle of view,

or field of view, if used on a full-frame 35mm camera. Digital and film SLR lenses are the focal length as marked. They will see a narrower range on a digital camera, and you can estimate the focal length required on a 35mm film camera to see this same view by multiplying the focal length by a crop factor, usually about 1.5; it depends on the exact sensor size, but 1.5 is a good ballpark figure to take for most modern dSLRs except, of course, full-frame dSLRs where the crop factor would be 1.

Aperture

This is the other most important parameter when discussing camera lenses. Aperture is always available as the range, and you're mostly interested in how much it can open, the more the merrier.



Understanding aperture and diaphragm blades

In the previous chapter on ISO, aperture and shutter speed we've discussed aperture in detail, do refer to it if you need to.

Note that larger aperture openings are defined to have lower f-numbers (yes, we understand the pain caused by this contradictory terminology). Lenses which allow lower f-numbers are often referred to being "faster". This is because for a given ISO speed, the shutter speed can be made faster for the same exposure, since a wider opening in the lens (lower f-number) would allow more light to come in. Remember that the aperture is also closely linked to depth of field, so at a given focal length, a lower f-number would correspond to shallower depth of field, allowing a more creative view of things. Additionally, a smaller aperture means that objects can be in focus over a wider range of distance, a concept also termed as the depth of field.

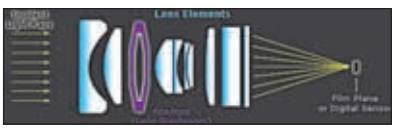
At the time of purchase of a lens, it's typically a good idea to first concentrate on focal length and aperture as the highest priority within your budget and then

move on to other features. Vibration Reduction feature might be an exception here in terms of importance. You'll find the focal range (or the excel focal length in case of prime lenses) along with aperture range length mentioned on the box.

So a 18-55mm, f3.5/5.6 lens means that at 18 mm of focal length, it can open up to a maximum f-number 3.5 and when you zoom in to the 55mm point the maximum opening up of the lens would be reduced to f/5.6.

Lens elements and image quality

Lenses are often complex optical assemblies composed of many "lens elements." Each of these elements have a specific role to play in focusing the path of light rays to the sensor in order to recreate the image as accurately as possible with the least amount of distortion. The distortion can be in terms of chromatic aberrations or even in terms of dimensions. In lenses with Vibration Reduction or Optical Image stabilisation, one or many lens elements would be involved in that process.



All working together to give you a great result

Optical aberrations occur when points in the image don't translate back onto single points after passing through the lens. This tends to lower the image quality by blurring, reducing contrast or mis-aligning colours. Lenses may also suffer from uneven, radially decreasing image brightness (vignetting, of course, when not used as a feature) or distortion.

Any of the above problems is present to some degree with any lens. It's always a good idea to read online reviews about the lens that you plan to purchase, check out sample shots and look for these optical characteristics.

Kit lens

These days the lens that's offered as a package with the dSLR is generally called the "kit lens". It's generally an entry-level quality zoom lens. This is usually a fairly general purpose lens designed for everyday shooting. On most low-end dSLRs you'll find this to be an 18-55mm lens, though on higher-end bundles you might find a 18-105mm bundled along. Though conventional advice goes that kit lenses are of lower quality and you should always prefer to buy the dSLR as a body only and to buy your own selection of lenses, we'd say that these days some of the kit lenses bundled along form brilliant company; for example, the Nikon 18-55mm VRII lens available with most of its cameras is a sure gem in terms of features and performance.

Zoom lens

A telephoto fixed aperture lens. Cannon 300m f/2.8

A zoom lens provides a range of focal length (say the 18-55mm range from our previous example) that the photographer can vary in sharp contrast to the "prime" or fixed focal length lens where it can't be done. The primary advantage of a zoom lens is that it's easier to achieve a variety of compositions or perspectives (since lens changes aren't necessary) without changing your physical position which might not be either convenient (say, in a party) or possible (say, in wildlife).

For an ultra-long range like 200mm+ focal length, you typically have two options. One is the variable aperture zoom lens and the other is the fixed aperture (Either at f/2.8 for mid-range telephoto or f/4 for ultra telephoto) lens. While the former ones are much more inexpensive they reduce the aperture at the telezoom end of the focal length hence allowing far less light to come in, which results in slower shutter speeds, which in turn will translate into blurry images without proper stabilisation.

On the other hand, the fixed aperture telezoom lenses (The ones you see with sports or wildlife photographers) are much more expensive (Often at least 10 times), far heavier in weight with huge dimensions as compared to variable aperture zoom lenses. The advantages are obvious in superior optical performance and the ability to open up to f/2.8 even at focal lengths upto 300mm.

Prime lens

A prime lens is a photographic lens whose focal length is fixed, as opposed to a zoom lens, so you can't zoom in or zoom out to change the composition without physically moving yourself. This use of the term "prime lens" is an Class A exhibit of the term retronym. Earlier, only prime camera lenses were available, and were merely called "lenses" or "objectives". Later, "auxiliary" lenses were available, which usually fit in front of the front element of the primary or "prime" lens.

One may question why someone would intentionally restrict their options by using a prime lens? Well, it's a valid concern and the answers are equally important. For the same price, a prime lens offers much supe-

rior optical image quality than the zoom lens. Also, below f/2 there are no commercially available zoom lenses, and almost all prime lenses at least open up to f/1.8 (some open up to f/1.4 and beyond) giving you the ability to shoot in very low light and much more artistic freedom. Sharpness available at almost all aperture ranges and the bokeh effect is matchless when compared to zoom lenses.

Bokeh from a prime lens

Other advantage of prime lenses come in the form of weight and speed. An inexpensive prime lens can generally provide as good (or better) image quality as a high-end zoom lens. Some prime lenses such as the Nikon 35mm f/1.8 offer rear focus control, ie the focussing ring does not come in the way of your filter or polariser (refer to the chapter on lens filters). This ensures that the polariser stays exactly as put.

Some people also use prime lenses as a budget macro lens with the use of reversal link.

Prime lenses, especially, excel in portrait and indoor photography as the light is limited and you want precise control of depth of field. The narrow depth of field in a portrait helps isolate the subject from its background. On lower end dSLRs, these lens also provide a much brighter image in the viewfinder which is critical given their small size. Speed and accuracy of auto-focusing in low light is also another advantage.

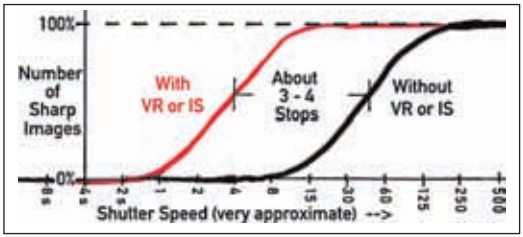
A 50mm prime lens is also known as a natural lens as it lets you see the world as-is in a full-frame sensor dSLR.

Image stabilisation

Among all the fancy features that are available in the lenses today, the one of most importance and impact is optical image stabilisation. Nikon calls it Vibration Reduction while Cannon calls it Image stabilisation, they both perform the same function and in almost similar ways.

Typically, in smaller digital cameras (read non-dSLRs) the image stabilisation is built into the camera, while in dSLRs, the image stabilisation

is mostly built into the lens. So effectively they have an array of motion sensors which detect the minute shake in your hand and body while you're shooting, and then using actuators they tilt/shift some lens elements to counter-act this shake. This cycle is repeated about many times a second. Amazing, isn't it?



Courtesy: KenRockWell.com

Usefulness of VR

As a rule of thumb, you should always use a shutter speed equivalent to the inverse of your focal length. So at 50 mm, you should use a shutter speed of at least 1/50s to get sharp photographs. With optical image stabilisation, you can easily shoot handheld at 1/15s at a focal length of 50mm allowing you to gain almost four times as much light. In typical test, image stabilisation boosts you up by at least 2 full-stops and if you're lucky then upto 4 stops in certain conditions. (Boost by 1 stop means twice the light)

Be aware of marketing gimmicks like Digital Image Stabilisation. All it does is some poor post processing to remove some blur partially from your photographs; stay away from it.

Buying a lens

Given the myriad of options available, buying a lens can turn into a nightmare. To make it easy for you we present a simple list of steps which, if followed, even to an approximation can make your life much simpler. After each step you'd notice that the number of lenses available to you would reduce to half and by Sstep 4 you should have only 3-4 lenses to pick from.

So here we go – six steps to help you find the best digital SLR lens:

1. Determine the focal length you'll need
2. Decide if you want a prime or zoom lens
3. Select a maximum aperture
4. Choose between first or third-party lenses (Hint: always try and fit a first-party lens in your budget, they offer excellent resale value also)
5. Evaluate any extra features
6. Read reviews and narrow your options .

EXPLORING FILTERS

A closer look at exploiting photography conditions using various filters

In the most basic definition, a camera filter is a transparent or translucent optical element that alters the properties of light entering the camera for the purpose of improving the image being recorded. In terms of usage to a photographer, a filter's importance goes way beyond the scientific function it serves. Be it adding contrast, sharpness, colour, intensity or simply, character to the image, a filter is a hidden weapon in the photographer's arsenal that, when used in the right way at the right time, makes for some truly breathtaking visuals. These camera accessories can be inserted in the optical path by being mounted onto a holder, most commonly a glass or plastic disk with a metal or plastic ring frame, which can be screwed in front of the lens or clipped onto it. Today, the sheer variety of filters available easily make the option worth experimenting with; so be it glass ones, filters made from resin plastic or polyester and polycarbonate ones, there will definitely be something suiting your need and style.

In their most successful of applications, filter effects blend in with the rest of the image helping to get a combined message across, aimed at getting the viewer more involved in the story being narrated by the photos. Inevitably considered in the planning stages, filter effects are actually a key part of the look of a production and if readily available at your disposal, they prove to be crucial last minute fixes to unexpected problems. It was realised early on that human perception and the photographic processes are quite different, and thus arose the need to use filtration and manipulation techniques to compensate for the human eye and brain's image processing to create, so to speak, more "natural" looking images. Filters in photography are classified according to their use, and this classification is also how we'll take a quick look at the popular options available.

Polarising filters

To generally increase outdoor colour saturation and contrast and decrease reflections, most helpful are polarising filters. And these are also one of the only filters which can't be replicated using digital photo editing. An indispensable tool in every photographer's bag, they require extensive experimentation and testing to develop an intuition for how a polariser might impact a picture. The scientific working of a polariser is fairly simple; it linearly filters out light in a particular direction in the first stage and in the second stage it circularly polarises the light before it enters the camera. What this does basically is reduce reflections from surfaces such as glass and water, and darken a blue sky. It's placed in front of a camera lens and filters out sunlight which has been directly reflected toward the camera at specific angles, thus diffusing the remaining light making it more colourful. However, this requires a longer exposure time since light has partially been discarded.

Difference using a polarising filter

A polarising filter will be capable of its maximum effect when one's line of sight is perpendicular to the direction of the sun, but this doesn't

always mean that this is where the image will appear to be more affected. By rotating your filter, you can toggle between angles that appear most polarised, and you should keep looking at the camera's LCD or through its viewfinder to continuously foresee results. As the result primarily depends on the angle, the image can appear to be uneven when using wide angle lens. Since some portions of the scene may be in a direction directly of the sun while others might be at a right angle, a polariser can cause one side of the image to have a stronger effect while leaving the other side without any visible changes in composition. Another characteristic that you're likely to notice with a polariser is how it increases colour saturation, resulting in greener foliage, deeper blue skies and more intensely coloured flowers – every photographer's dream! One of its most useful and visible effects is its removal of reflections and isolation of objects which are wet, underwater or behind windows.

Reduction of reflection via the use of a polariser

Reduction in reflection also has a direct consequence on reduction in image contrast, making it easier to capture scenes with a broad dynamic range, like balancing a bright sky with unreflective land. Thus, depending on how and where you use it, a well-angled polariser can make or break a perfect moment being captured.

UV filters

One of the most commonly seen around are Ultraviolet (UV) filters, primarily used to protect the front element of a camera lens since they're clear and don't noticeably affect the image. We may not be seeing it, but we all know that we're surrounded by UV light all the time outdoors. What we don't know is that film, as well as video, often exhibit a greater sensitivity to what is to us invisible. UV rays can show up as a bluish colour cast with colour film or can cause low contrast haze that diminishes details, especially when viewing far away objects in colour or in black and white. With film cameras, UV filters reduce this haze and improve contrast by minimising the amount of UV light that reaches the film. However, UV filters also have the potential to decrease image quality by increasing lens flare, adding a slight colour tint or

reducing contrast. Keeping your filter very clean will help counter reduction in image quality and using high quality UV filters will prevent any visible colour cast. It's often a point of debate whether the protection provided by UV filters outweighs the potential reduction in quality, but when expensive SLR lenses are in question, protection becomes the deciding factor as costs of replacing the filter are far lower than those of possible repair of lens. Another advantage for long-term users is that these filters keep the front lens in mint conditions and thus increase the resale value of lenses.


Neutral Density filter to allow longer exposures

ND filters

Another useful filter in photography is Neutral Density (ND) filter, which in simple terms is a semi-transparent piece of glass that, when placed in front of the camera lens, obstructs a precisely controlled fraction of light uniformly, without altering image sharpness or contrast. By reducing the amount of light reaching the camera's sensor, they are most commonly used when the given range of possible apertures does not allow for a sufficiently long exposure time. This can emphasise motion, or make an otherwise tumultuous scene appear surreal and tranquil. Alternatively an ND filter also enables larger aperture, leading to sharper photos and shallower depths of field. Either way this is a powerful tool, not given its due appreciation often, but worthy of a deeper look. They are one of the simplest filters to use with results not easily replicable digitally. Neutral Density filters are used to create any, or combinations, of a longer exposure time, a shallower depth of field and a sharper photograph.

Longer exposure times allow you to play around with images for artistic effects, like softening of turbulent water, blurring of grass patches in winds, or emphasising motion within crowds of people. For full effect, multi-second exposures are a must, rendering clouds as streaks in the sky and making waves appear as uniform, low-laying mist. With a lot of experimentation and some sound intuition, related desired effects can be

made possible depending on the nature of motion and amount of subject magnification. Apart from achieving longer exposures, a less common application is to enable a shallower depth of field in very bright light, yielding dramatic improvements in background blur and subject isolation.

Gradual Neutral Density filters

GND filters

Another hidden secret of successful landscape photographers is the Graduated Neutral Density (GND) or "grad" filters, which serve as an essential tool for capturing scenes with a broad dynamic range. Nowadays the grad ND effect can be applied digitally, either during RAW development or in subsequent photo editing by using multiple exposures and combining them later during editing, yet using the physical filter while clicking pictures will undoubtedly produce a higher quality result, having a huge impact on the eventual picture composition.

The filter is basically an optical device that allows for variable light transmission. Typically half the filter is of neutral density which transitions, either abruptly or gradually, into the other half which is clear. Thus the filter can be 'hard edged', causing sudden change in brightness, or be 'soft edged', offering smoother changes from light to dark. For situations where an extremely gradual blend is required, an 'attenuator' is used, changing density almost throughout the length. In general when using grad ND filters, wider angles of view are often enhanced more, primarily because these encompass a correspondingly greater range of brightness. Graduated ND filters affect two aspects of a photograph- the dynamic range and the local contrast. You can thus capture a scene whose range of brightness exceeds the capabilities of your camera, and even though such filters usually decrease the contrast between extreme light and dark regions, the contrast within each region actually increases, thereby improving appearance of colour and details. Their effect is usually determined by the strength of the grad ND, referring to the difference between reduction of light on one side of the gradient as compared to the other, and also on the rate of transition, referring to the rate at which the darkest side of the filter merges with the clearer side.

Other kinds of filters

Apart from these various special effect filters are used for added drama to pictures, available in a wide range of grades and useful for both colour and black & white images. Typically the optical effects all involve bending a percentage of image forming light from its original path to defocus it. The most commonly used filters in this category are **diffusion filters** and **cool and warm filters**. Diffusion filters soften subjects generating a dreamy blur, most often used in portraits. With such filters higher contrast scenes appear sharper, needing more diffusion than scenes with lower contrast. These requirements also vary with other conditions, like colour allows less diffusion than black & white, or like smaller file formats and large-screen projectors will allow lesser haze. Since the effect can be achieved in numerous ways, the diffusion filters from different manufacturers also vary significantly. The most common approaches are to use some kind of netting or mesh in the filter, which is also one of the earliest methods to accomplish the effect, and another way is to use something which is transparent but not optically sharp. When using gridding or netting technique, you can choose between various widths, colours, spacings and shapes (typically diamonds or squares). Nylon is popular choice for such meshes and the finer the mesh, more is the image area covered by mesh lines leading to stronger effects. The second most common way is **transparent diffusion**, where tiny globs of acrylic are deposited on one surface of the lens, allowing it to act as different micro-lenses to diffuse the light. Both these techniques can be digitally added to the images during post production, and these photo editing softwares in principle provide a very precise degree of control of the level of effect, however the overall look may be noticeably different.

Adjust colour tone on the fly

Another popular option to play around with in photography are cooling and warming filters which change the white balance of light reaching the camera's sensors.

Real-time Photoshop effects using filters, Vignette Effect

The effect will basically be used to add a colour cast, like warmth to a cloudy day to make it appear more like during sunset, or to correct an unrealistic one. Since most digital cameras automatically adjust for white balance, and this can also be changed afterwards using editing tools, these filters are slowly becoming redundant. Yet unusual lighting situations or underwater photography are only some examples which necessitate the use of this filters in scenes where an overwhelming amount of monochromatic light is present that no amount white balance can restore to full colour without introducing significant image noise in some colour channels. Another types of filters popular earlier but overshadowed by widespread adoption of digital photography today are colour correction filters and colour enhancement filters. In black and white photography filters are commonly used to manipulate contrast, as a matter of artistic preference or of necessity. Broadly speaking, filters generally lighten up objects of their own colour and darken those of their complement, with complementary colour pairs being green & red, orange & blue, violet & yellow etc. for instance a green filter will lighten up green foliage to show more details in outdoor photography while also providing more pleasing skin tones, especially against blue sky.

Now that we have seen the different types of filters at our disposal, it is also important to understand both sides of the coin before rushing to experiment too much as they can have an adverse affect on the image. Using a filter means you are effectively introducing an additional piece of glass between the camera's sensor and the subject, potentially leading to reduced image quality. This usually comes in the form of either a slight colour tint, a reduction in local and overall image contrast, or ghosting and increased lens flare due to light inadvertently reflecting off the inside of the filter. Another problem you may face is physical vignetting in pictures, leading to dark-

ening of corners relative to the centre of the image, an almost omnipresent fact of life in practical photography. This happens when their opaque edge gets in the way of light entering the lens, and the problem gets worse if we are stacking and using multiple filters.

Knowing all the pros and cons of using different types of filters is thus important before spending on these tiny tools. They generally come in two varieties- screw on and front filters with front ones being more flexible because they can be used on virtually any lens diameter, but are more of a hassle when in use as they have to be held by held in front of the lens when shooting. On the other hand, even though limited size matching is a disadvantage with them, screw-on filters are more popular as they can provide an air tight seal for increased protection, preventing any accidental motion relative to the lens during composure. To prevent vignetting, the height of the filters is also important, with ultra thin and other special filters being designed for use in wide angle lenses without blocking the edges. Manufacturers of lenses and filters have standardised on several different sets of sizes over the years, with threaded rounded filters being available among other varieties like square filters, rectangular filters, bayonet round ones, series mounting filters etc. Using filters is thus a foundation upon which to build by experience, and whatever may be your style and need, there will always be something new out there to try!

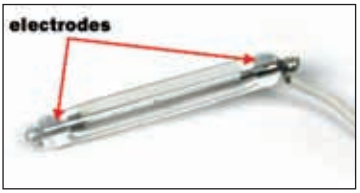
FLASHES IN PHOTOGRAPHY

A look at one of the most essential tools of a photographer

The simple flash is one of the most recognisable features in photography; from kids to the elderly, everyone knows when to smile right before the flash comes on, and flashes have indeed been used since forever to enhance the appearance of photographic subjects. Flashes exist to illuminate your photograph, thus any source that provides a short burst of artificial light within a certain colour range can be called a Flash. Almost all of today's dSLR cameras have inbuilt flashes, with a standardised accessory mounting bracket generally provided to allow an external flash unit, an option you commonly see being used by professionals at weddings, parties and other indoor events.

Let us first see how the camera flash actually works. From times when flash powder consisting of magnesium was literally ignited by hand to experimental high current flash LEDs, flash technologies camera have come a long way. The basic electronic flashtube setup you will find in most cameras broadly consists of a small battery for power supply, a gas discharge

tube which looks like a neon light to produce the actual flash and an electronic circuit connecting them. The tube has a metal trigger in the middle and is filled with xenon gas.



Typical camera flash tube, removed from the housing

The idea is simple enough; electrons in the electrical current move through the gas and energise the gas atoms, causing the gas to glow white. Modelling lights are common items around studios. They are basically an incandescent bulb close to the flash tube providing continuous illumination to subjects. For specialised purposes like capturing extremely fast moving objects or reactions, micro-flashes are available which are high voltage flash units discharging a flash of quick light with an exceptionally quick, sub-microsecond duration.

Though it seems simple, flashes prove to be one of the most widely misused camera equipments in photography. It is important to remember that when you use a flash as compared to normal camera exposure, you are adding basically handling two light sources- the ambient light, in which you can visualize the capture before clicking, and your flash, in which you can control and vary the intensity, position and distribution of light but not see the result before the actual shot. Thus you are in a way controlling factors that otherwise would have required changing the exposure or depth of field, but you have require extra intuition to achieve a desired affect and look without checking your camera. Thus it is critical to have a good understanding of how flashes change the appearance of a subject qualitatively.

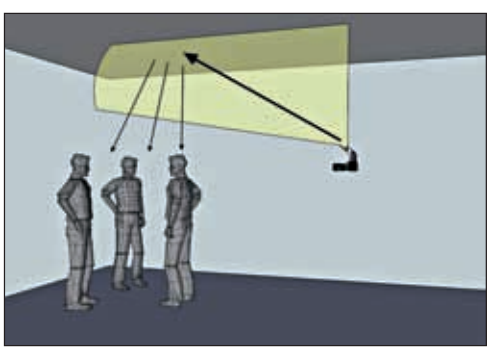
Lets look at a few accompanying terms you will most likely come across when dealing with flashes. Say for instance, Flash Ratio, which describes the mix between light from the flash and the surroundings. Flash ratios are controlled by modifying shutter speeds as they affect the ambient light entering the camera but not the light from the flash. Also, for a given amount of ambient light, this value is controlled by playing with two variables, flash intensity and length of exposure. One of the toughest tasks when working with flashes is understanding how different camera flash metering modes will affect the overall exposure. A simplified guide will be to treat the auto mode as having a flash ratio of 1:1 or greater if dim, else no flash will be fired from the camera. Program mode is similar to auto, except that it allows you to use the flash at your will, letting you forcefully use it in

situations where ambient light may be enough but a desired effect from the flash is needed. Aperture and Shutter Priority modes treat it as a fill flash (concept explained further ahead). And finally in Manual mode since all settings are under your control, the camera exposes ambient light based on how you set the aperture, shutter speed and ISO, allowing you to have any desired flash ratio.

Flash Exposure Compensation is another concept you'll encounter commonly, which is the key to changing the flash ratio. Exposure Compensation basically tells the camera to take whatever flash intensity it was going to use, and to override that by the FEC setting. The big difference is that while EC affects the exposures for both flash and ambient light, FEC only affects flash intensity. Most current SLR flash systems employ some form of through-the-lens (TTL) metering. Digital TTL flash metering works by bouncing one or more tiny pre-flash pulses off the subject immediately before the exposure begins, which are then used to estimate what flash intensity is needed during the actual exposure.

Now we'll see some important techniques in clicking with flashes. The first concept to understand is light distribution, which is how much contrast the image will have, or how much will the difference be between the lightest and darkest portions of the subject. This also describes what photographers call 'soft light', which is more scattered or originating from a larger area, and 'hard light', which is more directional and concentrated. When using a localized light source, the side facing the source will be intensely lit while the opposing side will be nearly dark as it receives no direct light but only that which is bounced off surrounding objects .

In comparison, in a distributed light source the highlights and shadows seem to appear softer because light is hitting the object from a wider angle in this situation. Conceptually grasping this concept is not tough, but realizing the practical implications takes more understanding. Less contrast can make pictures of



Flash Bounce Visualization.

people appear more appealing while facial features can be exaggerated in high contrast shots. Also the skin may seem to be rougher and often less desirable.

To achieve the effect of an evenly distributed light source either a flash diffuser or a bounced flash may be used. Also, though counterintuitive, aiming the flash away from the subject can actually enhance the appearance. This explains the use of umbrellas while clicking in studios, to first bounce off and make the flash seem to be coming from a larger, more distributed source. The only problem with this approach is the undeniable reduction in the intensity. Another limitation is the how it cannot be used outdoor photography where subjects are less contained. Flash diffusers are other common alternatives. It can usually be simply attached over the camera flash and is a piece of translucent plastic scattering the light from the flash. Not much effective outdoors but diffusers can significantly soften the light on subjects in indoor situations. To be remembered here is that overly diffused light is also not always desired, causing the subjects to sometimes look two dimensional and flat.

Daylight has an approximate color temperature of 5000K, and most flash units try to mimic this value. But white balance matching can be a problem when using flashes if the ambient light temperature is substantially different from this mean value. This surrounding light will appear to have a certain tint in such cases, and will be most apparent with artificial lighting or when the flash ratios makes the ambient and flash light sources completely distinguishable. This problem may also arise when the flash bounces off a colored surface like a painted wall etc. but then the effect is less pronounced as the ambient light is also getting the same obstructions. In a way this is not always a problem as the flash's white balance can be intentionally altered to achieve a certain effect like to better match indoor incandescent lighting or make it look like a sunset.

Flash White Balance distortion

Now your camera flash can be an on-camera one or an off-camera one, with both having their own plus and minus points. An on camera flash can

be imagined as basically being able to illuminate the subject straight head on, while an off camera flash will tend to provide an off angle lighting for photography. Practically you will see that off camera flashes will make the subject look more three dimensional rather than flat. This happens because with an on camera flash, the side of the subject that receives the maximum direct light is also the side being captured thus leaving little room for shadows to be visible while rendering a harshly lit subject, giving it like a hapless deer in the headlight sort of look. You most definitely would have noticed the photographer's assistant lunging around a hot camera flash in weddings and other indoor events but this is not always feasible. Thus a simple trick is commonly used to achieve this effect- bounce you on camera flash off an object like a wall or ceiling or use a flash bracket that will increase the distance between the front of your camera and the flash unit. This may not give the right effect for long range shots but the closer your subject is, the more substantial will be the off angle lighting effect. As you can imagine, flash brackets tend to be quite large since they need to extend far above or to the side of the camera body in order to achieve their role.

Another common term you may have come across in dealing with flashes is 'fill flash'. Fill flash or fill-in flash are today present in most DSLRs and point and shoot cameras too. It is basically a simple photographic technique used to brighten deep shadow areas, indicative of the fact that the photographer has used a flash to 'fill in' shadowy areas in the composition and plays the role of a secondary flash too.

In outdoor setups fill flashes can be used to highlight faces or any other parts of the picture you don't want drowned in the shadows. Indoors it allows you to see certain parts of your shot more brightly lit and make them more dramatic, like making the subjects' eyes seem more alive. Having said that, it is still a common misconception that a flash is used only in situations where it's dark. Contrary to this, fill flashes are most useful under bright ambient lighting, like back lit subjects, or when the lighting presents too much contrast. Most cameras do not fire the flash unless the scene is rather dimly lit, in which case you will need to forcefully use it. And in such situations when enough ambient light is present on using your SLR's flash it automatically acts like a fill flash.

Exposure triangle

Now, using your camera flash often can drain your battery much too quickly. For this reason, and to achieve more powerful illumination, external flash units are used. The flash within your camera can sometime be harsh on nearby people, but may not be useful for subjects slightly farther away. Often external units are bounced off a distant wall or ceiling to adequately illuminate such subjects while giving additional ease with modification of brackets, diffusers, filters and so on. External flashes also lie a little further from the camera's line of sight thus reducing red-eye and slightly improve light quality. In general too, red eye can be a big problem faced, caused by a flash which glares back from the subject's pupil, shining as a red due to high intensity of blood vessels present in that part of the pupil. When your flash is too focused and directional or your subject is looking directly at the camera with dilated pupils from the dim ambient light, unnatural red eyes are difficult to escape. Some cameras have a red eye reduction mode which starts with sending a series of smaller flashes so that person's pupils are contracted during the actual flash. If your camera does not have this mode, try taking pictures as far as possible in increased amounts of ambient light. Either way, it is difficult to eliminate the effect all together but it makes it much less prominent.

The best examples of flash photography are those when you do not even recognize that a flash has been used. Apart from the technique, lots of experimentation and practice can actually make you do wonders with this most essential of photography tools.

COMPACT dSLRs

A look at the EVILest thing in the world of photography

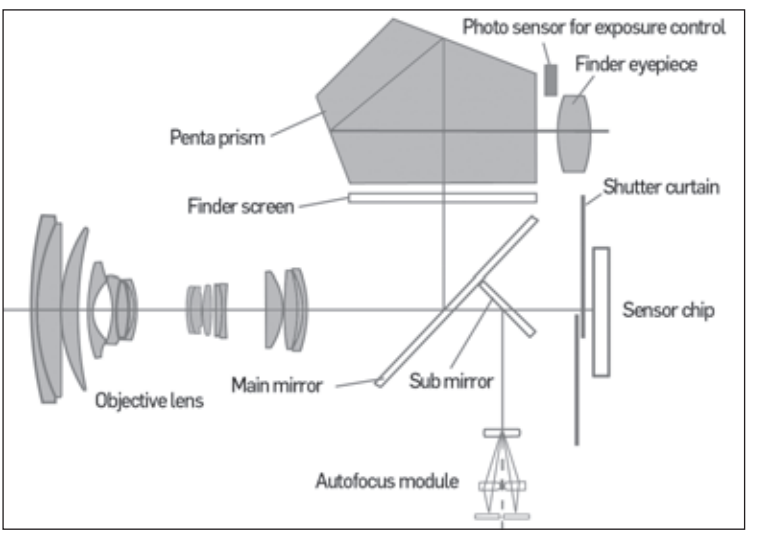
EVIL is in town. It is gaining popularity rapidly and soon it will reign the digital imaging world. But what is EVIL? EVIL or Electronic Viewfinder Interchangeable Lens is an emerging class of such digital system cameras, intermediate between compact digital cameras and digital single-lens reflex cameras (dSLRs). Also known as Mirrorless Interchangeable Lens Cameras are characterised by large sensors, no mirror, and interchangeable lenses, as the name suggests, and provide dSLR-quality pictures in a significantly smaller camera. These are pocket-size cameras that can outperform the bulky dSLRs.

The features that make EVIL the next big thing in the photography world are its convenient size and amazing photo quality. Unlike EVIL, dSLRs are bulky. Their design comes from the film days when the only way to see the exact image that would hit the film was to divert the light coming through the lens with a mirror and send it to a viewfinder. This mirror meant the body needed to be deep, and the lenses – further away from the film than those in a mirrorless rangefinder – was also bigger.

EVIL offering from LUMIX

Now we can see what the sensor sees either on a screen, or through an electronic finder. With the mirror gone, the body can be a lot smaller, just like a compact digicam. This means you can carry it with you everywhere, fit it in a jacket pocket and be ready for *that* picture, wherever you are.

Compact DSLRs do away with the mirror box assembly and pentaprism required with the optical view finder (OVF) of traditional dSLRs. Eliminating the mirror box allows the main camera lens to be moved closer to the image sensor, and the diameter of the main lens to be reduced, reducing the overall size of the camera dramatically. One obvious and important way compact dSLRs differ from traditional dSLRs is - they don't have an OVF. Instead,



How the ray moves inside the camera

you compose your photos using an Electronic View Finder (EVF), as you do in a compact camera.

The trick with the new EVIL cams is that they have large sensors. In the case of the Samsung NX10, this sensor is the same size as you'd find in a DSLR, and the others use the Micro Four Thirds format, a sensor which is half the size of a 35mm frame, but a lot bigger than the pinkie-nail-sized sensor in a typical compact. This gives the high image quality and low-light sensitivity of a dSLR. And because they have large sensors, the depth of field is shallower, and you can throw a distracting background out of focus.

Given the tiny pocket-sized lenses for these cameras, you will actually carry them with you. Better still; with an adapter you can use all your current dSLR lenses on the newer, smaller body.

Situated between compact cameras and dSLRs, two main types of MILCs have developed: compact and dSLR-like. Compact-style micros are approximately the size of larger compact cameras and, particularly with pancake lenses, are pocketable to somedegree. dSLR-style MILCs overlap with entry-level dSLRs, providing a contoured body and extensive features, like dSLRs, but in a significantly smaller and lighter body.

The Biggest Party in town

Sensor size varies, but is at the size of entry-level dSLR sensors – the Micro Four Thirds system uses the same size sensor as the Four Thirds System; smallest among dSLRs but over nine times the area of typical compact camera 1/2.5-inch sensors, while the Samsung NX camerasand Sony NEX cameras use a 50 per cent larger APS-C size sensor.

There is some inevitable trade-off between sensor size and compactness of the camera, due to the size of the lens required, so how small a compact-style full-frame MILC may be is unclear, though a full-frame DSLR-style MILC is certainly possible.

Even though the size does make them very desirable, compacts have lost out to dSLRs by being slow. Slow to power up, slow to zoom and slow to actually respond to your trigger finger. EVIL cameras have fixed this, and are as responsive as any entry-level dSLR. Watch out which model you go for, though. The current generation still has some trouble focusing

as fast as a bigger camera, although some models, like the Panasonic GF1, have this nailed.

As a new category, the EVIL is still relatively expensive, and you will pay as much for a body and lens as you would for a prosumer level DSLR. For many, even pros, the size difference alone is enough to justify this. For everyone else, you could wait until the likes of Canon and Nikon inevitably enter this sector. Then prices will start to fall, and things will get really interesting.

However, EVIL does have a few limitations.The lack of through-the-lens optical viewfinder (TTL OVF) is a defining feature of MILCs, and also found on compact cameras – a TTL optical viewfinder requires an optical path from lens to viewfinder, hence an SLR design or similar. If a TTL OVF is desired or required, dSLRs are the only viable option.

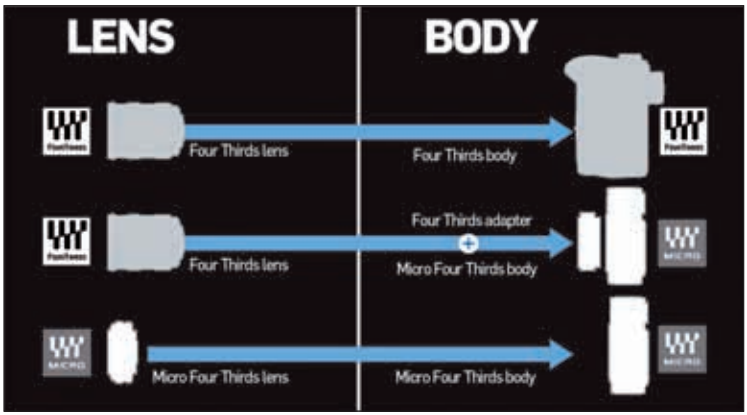
MILCs primarily use a rear LCD display for arm-level shooting, but some also feature an electronic viewfinder (EVF) for eye-level shooting, or an optical viewfinder that is not TTL (as in a rangefinder), which hence suffers from parallax, particularly at short distances.

Contrast-based AF has generally been slower than the phase-based AF systems found in dSLRs.The improvement in speed has been achieved by reducing the time taken for the contrast-detection autofocus system to begin operation after half-pressing the shutter button, doubling the sensor readout speed to 120 frames per second, and increasing the speed with which contrast detection routines operate. Although micros from Olympus and other manufacturers also have closed or leapfrogged this gap, there's still a gap in continuous autofocus accuracy and speed, and thus MILCs are still not as good at photographing moving objects, notably in sports, as dSLRs.

One advantage of contrast detection autofocus is that for still subjects, autofocus accuracy tends to be higher than with phase detect systems, as the camera is using the actual sensor output to determine focus. Therefore, CDAF systems are not prone to calibration issues such as front or back focus as can occur with phase detect systems.

All extant MILC or EVIL formats use a new lens mount, which is somewhat incompatible with existing lenses. This means both that existing lenses cannot be used without an adapter, and that relatively few native lenses exist for these cameras at the time of their introduction, as new lenses must be designed and manufactured for the new mount.

While they are interchangeable, compact dSLR lenses are not compatible with traditional dSLRs, even when the cameras come from the same



Visual Comparison between various four third systems

manufacturer. They differ in focal length and size since they are paced closer to the image sensor.

Panasonic offers an adapter that allows you to use Four Thirds dSLR lenses with those of Micro Four Thirds dSLR. The adapter essentially moves the lens away from the sensor, allowing the optics to function as in a traditional dSLR camera.

Compact-style MILCs with pancake lenses have generated significant excitement in the photographer community, as they finally provide a pocket able digital camera with a large sensor ensuring high image quality. dSLR-style MILCs and compact-style MILCs with larger lenses have also generated interest more as refinements on the overall dSLR concept, rather than creating new possibilities.

Beyond the interest to consumers, MILCs have created significant interest in camera manufacturers, having potential to be a disruptive technology in the high-end camera market. Significantly, MILCs have fewer moving parts than dSLRs, and are more electronic, which plays to the strengths of electronic manufacturers such as Samsung and Sony, while undermining the advantage that existing camera makers have in precision mechanical engineering.

The two main makers of dSLRs, Canon and Nikon, have not yet officially announced any MILCs. As noted above, however, Nikon is rumoured to have an eminent smaller sensor system coming. Other rumours suggest both are working on systems with traditional dSLR sensors.

Longer-term, MILCs may replace dSLRs entirely in some categories or among some manufacturers, with Olympus America's DSLR product manager speculating that by 2012, Olympus DSLRs (the Olympus E system) may be mirrorless, though still using the Four Thirds System.

It is imminent that the new compact EVIL cameras will make the dSLR cameras history.Contrast detection autofocus will eventually measure up in speed and predictive abilities to phase detection. Adapters will safeguard existing investments in dSLR lenses. So there is no reason why photographers will stick with the bulkier traditional formatIf image stabilization can be achieved, there is no reason why auto object tracking will not be a standard feature one day.

The push from technological innovations tends to be inexorable. There is no reason why it will not be the case with compact dSLRs.

With a smaller camera, you can blend in. With an EVIL camera, you can blend in and still get great shots. And because there is no mirror to flip, they're quiet, too. So unless you have a specific use that these cameras can't meet you have no reason to buy a dSLR. Instead, consider being EVIL. You might like it.

TRIPOD AND MONOPOD

Now that you've understood the basic functioning of a dSLR, we look at how tripods can capture sharp and breathtaking images and why monopads are a good alternative

The generic image of any professional or even budding photographer is never complete without the quintessential jacket with several pockets and zips, and of course a tripod in hand. The basic purpose of any tripod is to stabilise and elevate the camera for sharper images, and support various accompanying equipment. Both, in still and in motion photography, tripods prove to be a photographer's best friend by preventing camera movement and providing critical image stabilisation, especially when using telephoto lenses or making slow-speed exposures. Be it on the field or in studios, tripods help in gaining precise framing of an image, allowing for more thoughtful and clearer pictures to be taken even with less light or a greater depth of field, in addition to enabling several special techniques.

Tripods

First of all let us take a quick look at the construction of tripods. The basic parts of all tripods are fairly straightforward, with three collapsible telescoping legs and another similar section on the top that can be lowered or raised, and the head on the top containing the camera mount and various joints and handles that allow a camera to rotate, tilt or pan. The mounting head usually includes a thumbscrew which couples to a female receptor located on the vast majority of cameras, and maybe integrated with the tripod or be a separate part altogether. The most common types of tripod heads are pan-tilt heads and ball heads. If you are shooting at moving subjects or want to quickly point the camera freely in nearly any direction before locking it into position, ball heads should be used, which make use of a simple ball and socket joint to allow movement of all axes of rotation from a single point. If you want to independently control each of the camera's two axes of rotation (left/right and up/down), it is better to go in for a pan-tilt head. These are most useful once the camera has been carefully leveled and the composition needs to be shifted slightly. While using ball heads, the advantage of free motion can also be a disadvantage because when you unlock the camera's position, it may cause your composition to no longer be level while trying to alter a single axis of rotation.

A Tripod lets you take a steadier shot

Lens Collor for mounting a lens on a tripod/monopod

Another important part of the tripod

is the lens collar, used mostly for large telephoto lenses, and is an attachment that fits around the lens somewhere near the base or middle section. Then the head directly attaches to the collar itself instead of to the camera body, causing the camera plus lens to rest on the tripod at a location much closer to their centre of mass, placing lesser torque, and helping it function without creeping and slipping. A lens collar can also make a big difference in how susceptible the tripod and head are to vibrations. The next important constructional feature to consider is the material of the tripods, which are most commonly made of aluminum and carbon fiber but can also use steel, wood or plastic. Though aluminum ones are cheaper than their fiber counterparts, they are also a lot heavier for the same amount of stability and can be uncomfortably cold to handle with bare hands in cold weather conditions. Fiber ones generally provide better dampening of vibrations too.

Now that we are familiar with the built of tripods, let us dive deeper into their uses and handling. The basic function of a tripod is fairly simple- to hold the camera precisely, producing a sharp image without blurring, but its uses and advantages go way beyond just holding a camera steady. Several specialty techniques require the use of tripods, like taking a series of photos at different angles to produce a digital panorama, click photos at different exposures for high dynamic range (HDR) images, or take series of time lapse photographs to produce an animation among others. Whenever you want to precisely control your composition or need the camera in the right composition well in advance of the shot, such as in sporting events, a tripod comes to your rescue. When taking a series of photos to produce a composite image, such as selectively including people in a crowd or combining portions lit by daylight with those at dusk, it's a tripod that makes the job possible.

Weight is an important consideration

So, without doubt, you can get a lot out of your tripod by experimenting with different styles and techniques, but when choosing a tripod, what should your considerations be and what competing factors

are involved is still to be discussed. Even though finding the best tripod requires identifying the optimal combination of trade-offs for your type of photography, the top considerations are usually its sturdiness, weight and ease of use. The stability factor is probably why you bought a tripod in the first place- to keep the camera steady. Though the ultimate way to gauge the sturdiness of a tripod is to try it out, there are various technical specifications that can help you out like the number of tripod leg sections, the material and thickness of leg units, the length of the legs and whether a center column is needed to reach eye level. Tap or apply weight to the top to see if it vibrates or sways, and the best check is to take a few test photos.

The next most important factor is the tripod weight. A fairly straightforward consideration, it can decide how you use the tripod, like whether you can take it along with you on a trek or even on a short stroll around town. Being light weight is thus important for increased usability, but it is more important to make sure that too much sturdiness is not being sacrificed for portability, and vice versa. Further, tripods that do not extend high may weigh a little less but these may also not be as versatile as a result. And finally what's the point of having a tripod if it stays in the closet because you find it too cumbersome to use or end up missing shots as the setting up process is too long? Thus a tripod should be quick and easy to use, which depends majorly on the type of head- pan-tilt or ball headed, and how one positions the leg sections. Either lever/clip locks or twist locks are used in locking mechanisms to extend or contract the tripod's legs and this guides the ease and speed of set up. Lever/clip locks tend to be much quicker to use, although for some types it can be tough to grip when wearing gloves. Twist locks are usually more compact and streamlines but sometimes require both hands if you wish to contract or extend each leg section independently.

Once all important factors have been covered, there are a number of other considerations that will guide how and where you end up using your tripod. Take the number of tripod sections for instance. In general more leg sections reduce stability but also reduce the size of the tripod when fully contracted. It can also mean that it takes longer to position or fully extend the tripod. Similarly to be taken into account is the maximum and minimum height of the tripod. You should make sure that at its maximum extension, the tripod is high enough for you to work comfortably without crouching at your height. To note here is the fact that the tripod's height specification does not include its central column as this can make the

Table Top or Mini Pod

camera less steady. But usually photographers make use of the fully extended tripod to be able to capture pictures other than from the eye level most of the times, since this makes for an ordinary looking perspective. For photographers who take a lot of macro photos of subjects on the ground or those who like to use extreme vantage points in their pictures, the minimum height of the tripod is also a crucial consideration. Finally, there is the contracted tripod height, which is primarily for the photographers who need to fit their tripod in a backpack or suitcase, and depends mostly on the number of leg sections provided in the tripod.

Apart from regular tripods there are today a number of modifications in the original designs which allow for variations like tabletops, mini tripods or even monopods. A tabletop or mini tripod is a smaller, sized down version of a regular tripod, and used usually with compact cameras, again for increased portability.

This portability often comes at the expense of versatility, as tabletops can only really change the camera's left/right or up/down orientation and it is not possible to shift the camera to a higher or lower height. This can also be an advantage as it allows for taking interesting pictures from a different perspective rather than from eye level. But it can't be used in all terrains and locations as finding the best surface to place it is more important than when working with tripods.

Monopods

Monopods, the name being self-explanatory, in particular, are a popular option amongst enthusiasts who are not necessarily going to be shooting at extra slow speeds and require light and faster setting up options for photography on the move, and are most commonly used to hold up heavy cameras and lenses such as large telephoto lenses for sports or wildlife photography.

The lighter weight and size that monopods offer are probably their best features allowing for increased portability, and since only one leg has to

be secured and worked with, you can set up and be ready to shoot within seconds when the moment comes. Monopods don't eliminate complete camera shakes but give more stability than hand held options, with the advantage being that you have extra support to cut back vibrations but are also less tied down with more flexibility to move around. Alternatively, monopods can simply be used to increase hand-holdability for situations where just a bit longer shutter speed is needed but carrying a full tripod might be too much of a hassle.

Whatever be the type of tripod, monopod or tabletop you may use, ultimately they will prove to be merely instruments to augment your range of shooting, allowing you to try out more styles and techniques, but may not necessarily enhance your skill-set as a photographer. But still, when the real moment comes, every little help counts, right?

POST PROCESSING

Kudos on capturing that amazing picture, now let's see how you can fine tune it

Taking the perfect shot is all about technique, style, timing and a bit of good old luck! But after you finally manage a worthy original click, there is still a lot that can be done to make your pictures stand out. Post processing has slowly emerged as one of the most critical aspects in giving your photos a sense of character and making the overall effect more dramatic in a way. Though a pretty popular and highly utilized option today, this is still a topic of debate in photography circle as some purists consider it as cheating or trying to find an easier way out. The arguments on both sides are numerous, and very subjective. The basic idea behind post processing is to make the photo look more like how you saw it rather than how the camera captured it. All cameras used these days, from simple phone ones to complex SLR systems, have options to adjust simple parameters like contrast, color, sharpness etc. But once a picture has been taken, there is always scope to play around with these and other

added features in the post processing stage to get a more soulful shot. So post processing may not necessarily be a procedure that you'll want to try out on all your photos (sometimes the originals are better left that way!) but whenever you want to get a certain look just right, it's always a welcome help.

Let us start with what most professionals now refer to as a digital image editing "workflow". This is simply a series of steps to guide to you in the quickest way through the process. It is not a rule but merely a guideline that you can tweak to your requirements once you are comfortable with the whole process. What you basically will be doing is- transferring your pictures from the camera/ card into your computer, editing and cleaning them by adjusting elements in your photo like the white balance, exposure, noise reduction etc in different layers, cropping them to remove any distracting

Example of what post processing can do to your photographs

section or as per your need, and finally saving the finished picture in the required format. Obviously the critical step here is the editing part where your intuition and aesthetic sense as a photographer will matter most, and which can really make or break the "look" you are trying to achieve. In this section we'll go through what are the main elements you'll need to alter, and how to actually do so. Since most steps you'll follow are fairly standard and universal so most photo editing software should work.

Adjusting the white balance

One of the first things you should adjust is the white balance (WB) of your photo. WB is the process of removing unrealistic color casts so that objects appear white in person when rendered white in your image. The color temperature of the light source is to be taken into account here, meaning the relative warmth or coolness of white light as you physically see it. Since the correct white balance affects the entire feel of a picture, right from the color saturation to the contrasts, it's a crucial parameter to be set right. Fortunately, most digital cameras contain a variety of preset white balances so during critical shots you don't have to deal with color temperatures every time. In

whatever software or photo editing tool you use, through the controls in front of you, first adjust the "temperature" slider to as correct as possible, to control the relative warmth of the image, and then refine the "tint" which controls the green-magenta hue shift.

The magic of using white balance

The more dramatically lit your scene is, more are the chances of your camera failing to capture the right WB, so extra attention should be given when shooting sunsets, indoor lighting or low light photos etc. Most software you use will have something similar to a "white point dropper" tool that allows you to select any part of the picture which ought to be neutral gray and then automatically sets the WB so that this part's color cast is subtracted from the entire image.

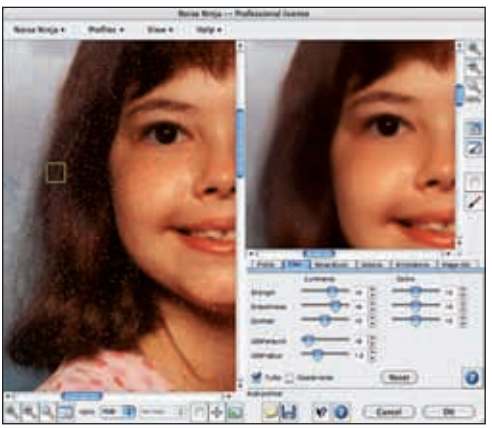
Adjusting the exposure

The next step in the editing process is generally exposure compensation and recovery. Though it is always desired that everything possible is done to get an accurate exposure at the time of capture itself, this isn't always practically possible, thus arises the need for exposure compensation or adjustment.

Histogram your most accurate friend

An objective guide to this is analyzing the image histogram, which essentially tells you whether or not your image has been properly exposed or not,

whether the lighting is harsh or flat and what adjustments will work best, helping you gain a better theoretical understanding of the subject, not just on the computer but also as a photographer. Also when you view the photo at a small size on screen, it is somewhat easier to judge the exposure, which a lot more on your artistic intent rather than being governed by a set of "right" values. So you should pay extra attention to whether there are any blown highlights or lost shadow details and on most software you might be able to recover these by simple options like "fill light", "recovery" or "black point" tools. Finally, whatever technique you apply, steer clear of over- compensation; on increasing the exposure too much, the shadows might have too much visible noise, and decreasing it too much will make blown highlights more apparent, both cases equally undesirable.



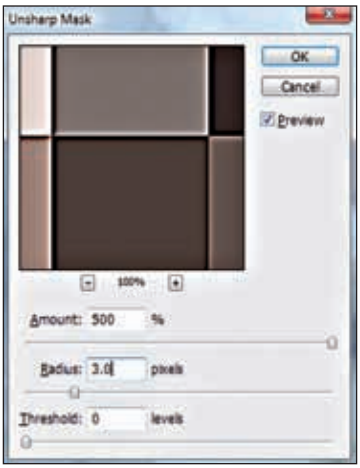
Noise Ninja, one of the most respected tools

Reduce noise

Once your WB and exposure are set you can start working on cleaning the image by noise reduction, and this will be most effective if done before other image editing like contrast, sharpness etc. Image noise can be treated as the equivalent of film grain for analogous cameras which becomes apparent as random speckles in the picture, significantly degrading overall quality and compromising on the level of details. Sometimes this noise is desirable if you are going for an old fashioned grainy look, or want to increase the apparent sharpness of the image. But in most scenarios it serves as an unnecessary distraction, which increases with the sensitivity setting in the camera, length of exposure or even temperature. Noise from a high speed ISO is most easily addressed but the aim should be noise reduction rather than complete removal to prevent the subject from looking unnaturally smooth.

In case you have a major clear up needed, you can even make use of dedicated software like Noise Ninja, Grain Surgery, Neat Image etc. In certain specialized scenarios a technique referred to as Image Averaging

is used when you cannot afford to lose out on sharpness because of noise reduction, which works on the assumption that the noise in your image is truly random, and such random fluctuations above and below actual image data will gradually even out as one averages more and more images. Neat Image is one of the easiest tools to implement the concept, or if you are an ardent Photoshop follower, it can be quickly done using layers, by stacking each image in a separate layer and blending them such that all contribute equally.



Example of using the unsharp mask

Sharpen your images

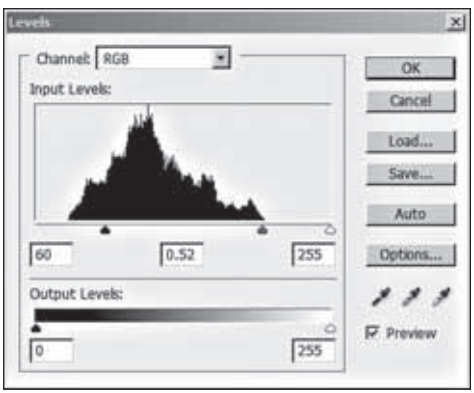
Now that most major aspects of the image have been taken into account, let us brush up on the details. Some of the first few steps in this are usually sharpening, clarity and local contrast adjustments. Image sharpening is a powerful tool for emphasizing texture and drawing viewer focus. Digital camera sensors and lenses always blur image to some degree, requiring correction. Most image sharpening tools work by applying what is called an "un-sharp mask", which works by exaggerating the brightness difference along the edges within an image. In Photoshop you can access the un-sharp mask by clicking on the following drop down menu: `Filter > Sharpen > Un-sharp Mask.`

On most software you'll most probably have simple sliders to guide the level of sharpness. An ideal way to go about is by taking it all the way up or down and trying to see what difference it makes to your image. A few experiments like this will give you a good feel of what an optimal sharpness value is, where the delicate balance can be achieved between making edges appear sufficiently pronounced while also minimizing visible under overshoots (called "sharpening halos"). There are fairly standard sharpening settings in almost all photo editing software, including radius, amount and threshold (masking). "Radius" here controls the size of the edges that are being enhanced, thus a smaller radius will be enhancing small scale details, and you'll generally want a radius setting comparable to the size

of the smallest detail within your image. The "amount" is indicative of the overall strength of your sharpening effect, listed mostly as a percentage value. You can always start with the 100% mark and work your way around. Finally you'll usually encounter a "threshold" setting too, which controls the minimum brightness change that will be sharpened, that can be used on pronounced edges while leaving the subtle ones untouched, especially helpful in avoiding sharpening noise. If available in certain software, you may also come across a setting similar to "detail", which allows you to relatively sharpen the fine versus coarse details within your fixed radius value, thus affecting the overall sharpening. Specialized techniques like local contrast enhancement may also be used in some cases. This aims at increasing the appearance of the large scale light- dark transitions, giving an image its "pop", creating three dimensional effects that mimic the look naturally created by high end cameras. Identical to sharpening using un-sharp masks, in Photoshop and other image editing programs, for applying this effect you can use the layers concept, except that the "radius" is much larger and "percentage" much lower.

Work with contrast and brightness

Usually after sharpening the image contrasts are adjusted. If you have clicked in a bright indoor lighting or into the sun, your image will most probably suffer from low contrast. Too much contrast can lend a certain unrealistic look to your image, avoided most often unless you especially want a certain kind of look, and it also make colors appear more saturated in pictures. In most simple editing software you'll again have sliders to help manage the level of contrast. Again you can experiment till an optimal setting intuitively come to you. In Photoshop and some other image editing software, you can use Level tools and Curve tools for this same function.



Level Tool

The Level tool can move and stretch the brightness levels of an image histogram with the power to adjust brightness, contrast, and tonal range by specifying the location of complete black, complete white and mid-tones in the histogram, and since every photo's histogram is unique, there is no single set of rules to guide you here. Similarly, Photoshop's Curves tools are perhaps one of the most powerful and flexible image transformation effects, and since photographers effectively paint with light, curves are central to their practice because they affect light's two primary influences: tones and contrasts. Tonal curves are essentially what gives different film types their unique character, so understanding how they work allows you to mimic any film without ever having to retake the actual photograph. You should however always keep a tight hand while applying these tools, as anything that stretches the image histogram increases the possibility of posterization.

Rotate or crop your clicks

Finally now you'll have an image with most alterations done and taken care of, and the most important part left now is the correct framing of your shot, requiring rotation or cropping of the original image. A vast majority of shots can be dramatically enhanced simply by cropping them to strengthen their composition. No definite principles guide this step and it's all about your personal vision of the photo, but a pretty well known and powerful compositional technique is the rule of thirds (covered already in the section Developing an Eye for Photography). You don't need to worry about perfectly aligning everything with the thirds of the image but consider it as a rough, tried and tested guideline, and what's usually more important is that your main subject or region isn't always in the absolute center of the picture. This doesn't mean symmetry isn't ever beneficial, just that the specialty and uniqueness of the subject should be portrayed best. All editing software have fairly easy to apply cropping tools that allow you to simply move your cursor across the edge points to carve out the portion you need. You may also want to crop your image so that it exactly matches a given print size, then the aspect ratio of your crop can often be specified within your photo editing software making the process much easier.

Now you have a pretty decent idea how your shot has emerged but there is still scope for further refinements like colors and enhancements which is really a catch-all category that you can go wild with! Altering the colors in your image means playing around with the saturation, vibrance or other

such options. If you have already have the correct settings for white balance, exposure and contrast on your image, then these settings are usually not required and you should make it a point not to go overboard with these effects. But the major retouches you'll want to do in this step are selective enhancements, be it spot removal of dust blemishes, creative sharpening (like the eyes of someone in a portrait), or selective noise reduction in otherwise smooth areas (like skin or the sky). All good photo editing software will provide you with a gamut of options for these activities, like a healing brush, clone tool, layer masks, and other similar adjustment tools.

After you've achieved the final desired "look" of the photograph and saved a final copy, the next step depends on how and whether you intend to use or share this image. Using a process called "digital image interpolation" you'll need to resize the file whenever you alter the display size of your photo, and the resize strategy will differ depending on whether you intend to make the image larger or smaller. While upsizing images, remember to perform the enlargements yourself instead of having it done by the printer, else it's easy to create prints which appear digital/ pixilated. Similarly when downsizing an image you should make sure you avoid introducing non-image patterns such as moiré artifacts on top of tiled roofs etc. Either way, what's often even more important than the resizing is that it is duly followed

Faceoff

by output sharpening next. Output sharpening is usually the very last step in post processing of images and has settings customized for the particular output device, including due considerations for the size, type or viewing distance of a print as applicable. This process is particularly useful to offset any softening caused by the resizing of your image for the web or mail.

The software to use for post processing

Now that you are fairly familiar with "what" should be done, let us see the "how" part too. Depending on what area of photography you are pursuing, there are several mainstream programs you can use to edit your images. The volume of images and the extent of editing desired will guide your choice of software. The most popular options within the community remain Lightroom and Photoshop, and Aperture for Mac users

Targeted at the professional photographer, Lightroom and Aperture provide a complete workflow solution for managing, editing and outputting digital images. While Lightroom and Aperture are perfect for the casual editor and have been made keeping the photographer in mind, Photoshop is still where the advanced post processing takes place, like exposure blending, panoramic stitching, cloning and other intricately detailed works that most other programs are still not equipped to handle. Essentially, Lightroom provides you with many tools and processes that streamline your editing, like modules or filmstrip, which is fantastic for photographers who have large volumes of work and are going to apply relatively simple edits to batches of photos at once, in a more simple, straightforward and reversible way than in Photoshop. Aperture, like Lightroom, has many great organizational features with a bit different interface, like the "Develop Module" feature in Lightroom is similar to the "Adjustments" in Aperture. Both have there much debated and compared lists of pros and cons, but in general it is widely agreed that Lightroom is better for printing and Aperture is more streamlined in organizing your images (mainly due to the Books feature). Then of course there is the ever favorite Photoshop, which is still somewhat of an industry standard. The software became so popular that the word is now commonly used as a verb referring to editing and post processing of images in general. A more sophisticated software in all respects, its biggest benefit is layers – more precisely the ability to mask or blend layers to create a mosaic of edits in the right combinations. The learning curve is rather steep for this one, but the reward is certainly worth it.

Gives you options like upload, blog, getag etc

Apart from these standard software, today there are a wide variety of programs meant for the common user – who is not necessarily a budding photographer in the making but is looking to make his everyday phone or digicam pictures more dramatic and stylized. The most popular on-the-go program that you can use without any tutorial is probably Picasa. The photo viewer is a common option today and the ease with which it allows you to re-touch your images has made it one of the most widely used programs for such an audience. What adds to the popularity is the ease with which you can sync up all your local folders in the app with the Picasa Web Albums online and can also blog and tweet from Picasa on the supported platforms like Blogger, WordPress etc.

Software like Picasa are ideal for people who may not necessarily want to go into depths of every effect you apply, but are more interested in basic touch-ups. Almost all options like brightness, color temperature, back ground lighting etc are present in the form of easy to use slider bars with which you can experiment freely and choose a value that suits your desired look, along with options like adding subtle (or not so subtle) effects like sepia, tint, soft focus, filtered black and white etc. It also gives you a quick way to organize your collections and with features like the face recognition option allow you to view people albums at a glance where the software automatically recognizes facial features and if you provide it with the name of a person in a particular image, it will keep updating that album with all new photos of that individual you add. The only major downside is the huge amounts of disk space Picasa eats up.

Online editing options

Similar editing features like this are now widely available online through dedicated sites like Pixlr, phixr, Rollip, PhotoFunia, Picnik, FotoFlexer and many more similar web apps. They allow you to quickly upload pictures and apply adjustments like color, contrast, brightness etc online only, though for obvious reasons you usually undergo a sizeable reduction in size (and related reduction in quality) of the image. Apart from the standard adjustments that you can do, one of the most fun features of these sites are the pre-set effects you can apply on your image like making it look like an oil painting, a comic strip, giving it an aged, vintage, make it a watermark look etc. In Photoshop or Lightroom too you can reach these “looks” but with a lot of careful manipulation as compared to simply uploading a file and picking an option from a list. Then of course there is a gamut of sites

that allow you have fun with snapshots by putting them in comical frames, letting you put faces behind funny cut outs, adding funny graphics, ones like Easymoza which allow you to make mosaics out of your pictures, Tatmash where you can put a tattoo on a person and see the outcome, PicFast which allows you to transfer a scene to a funny surrounding, Citrify where you can remove pimples and reduce wrinkles with a single click and many more such web apps. What suits your need can be best decided by you, so it is best you try out as many options as possible before you settle down and turn your loyalties to any one program or app.

Beyond all the major steps covered above in the post processing of images, few routinely followed recommendations are to archive your collection using backup files or even monitor calibration to properly view on your screen whatever you've produced after much hard work and effort. Whatever effects you apply, you should always remember that post processing is never an alternative to capturing the right shot. It merely can make the picture an improved version of itself but can't replace good photographic techniques and timing in the first place. The merits and demerits may be endless, but since everyone else is doing it, post processing becomes like a necessary evil. So be it a wonderful nature shot or a simple moment with friends, go ahead and give your picture the extra effort it deserves, keeping in mind that too much of everything is bad!

CELLPHONE PHOTOGRAPHY

You don't necessarily need a dSLR to capture amazing photographs and that's exactly what we explore in this section

If you are the kind for whom the mobile and its inbuilt camera is always on and the digital camera at home is gathering dust, then this article can be very useful for you. These days, camera phones have flooded the market. With many choices available, you are confused as to which one to buy. This wasn't always the case. Just a few years ago, photos from phone cameras came out pixelated and poorly lit. No way would you have thought of ditching your regular camera for camera phones. But as smartphone makers have increasingly realised the potential of the built-in camera, there have been a deluge of phones with cameras that can match and sometimes outperform low-end dedicated devices in a snap.

Features to look for in camera phones

The question now stands what you must look for in phone cameras. Well, first and foremost you must look for those with 5-megapixel or higher resolu-

The Omnipresent eye of today's world

tion as they tend to have more and better features than their low-resolution brethren. They produce pictures big enough to print at up to A4 in size; that is plenty for a mobile snap. However, jumping up to 8 megapixels or 10 megapixels can increase digital "noise" without visibly improving detail.

Autofocusing is an absolute must. Look out for a macro mode for really sharp close-ups. Some camera phones come with all manner of specialist scene modes. More useful are easy, one-touch overrides such as exposure compensation for highlights or shadows, and spot-focusing to concentrate on your main subject.

Camera phones are notorious for taking extremely poor pictures in low light conditions due to the weak nature of the LED flashes that they use. Recently, however, new technologies have emerged that produce superior low light performance without compromising on the camera phone's battery. One such technology that one must look for in mobile cameras is Xenon flash. A proper xenon flash, like the ones found on dedicated cameras, will punch out enough photons to light up an entire room. It gives off an extremely strong burst of light, typically up to several hundred thousand lux but has an extremely short duration, of the order of 50-100 microsec-

Many companies focus on the camera as the USP of their phone

onds. Although the duration is short, however, the power of the flash is so strong that good results can be obtained.

Another feature to look for is Geo-tagging Support. Geotagging photos with location coordinates has become a popular application of GPS technology. Geo-tagging adds coordinates to a digital image so that it can be accurately placed on a digital map. It has spawned a new market we call photo-mapping that has compelled the manufacturers of digital cameras, cell phones and GPS receivers to develop a variety of products designed to make it easier to stamp images with GPS points. Phones with built-in GPS automatically geo-tag your photos with their location, and a fast Internet connection is great for instantly uploading pictures to the cloud. Smart phones make fantastic camera phones, as apps can fill in any gaps in the features list. There are apps out there to stitch together panoramas, add visual effects, edit your photos on your mobile and even replicate old film cameras.

Onboard flash might be a bigger deal than you think

You can also look for features like face

detection, intelligent exposure, high-dynamic-range options and "smile shutters" that only snap a photo when your friends are grinning. One of the flaws of mobile cameras is shutter lag. There is nothing more frustrating than having the perfect image on screen and missing it because your phone takes seconds to focus and fire. Shutter lag refers to this irritating gap between when you press the shutter button and when the camera actually takes a photo. T-Mobile touts the camera as having "zero" shutter lag. The camera records continuously when the camera application is open and grabs the frame that corresponds with when you pressed the button.

When it comes to screens, quality is more important than raw size. Look for displays of 76 mm (3 inches) or more, with good pixel density – perhaps 480x850 or higher. There are various other new features that can be seen in the new releasing smart phones. They have three special picture-taking modes: "SweepShot" records panoramic photos by making a sweeping motion across the scene, "ClearShot HDR" combines three exposure levels into a single photo, and "BurstShot" takes several photos in rapid succession. Users will be able to post their photos directly from the camera app to Facebook, Picasa, or Flickr.

A good enough reason to get an iPhone

Other than these features, there are various applications that one can look forward to like Instagram in iPhone. Instagram is a free photo-sharing application designed for use on Apple iOS devices. The application is compatible with any iPhone or iPod Touch running iOS 3.1.2 or above. It allows users to share their photos after applying a variety of effects or filters. Users can share photos through the Instagram app or using a variety of other social networking products such as Facebook, Twitter, Foursquare, Tumblr and

Posterous. Instagram is growing, each and every week. It's now growing twice as fast as Flickr.

For Android users, Lightbox is a very similar application. The lightbox photo app lets you take pictures, apply filters and effects and upload them to either the lightbox account or any social networking websites like Google + and Facebook. The app includes camera and flash settings which is very convenient and easy to use. The app can also pull pictures from your social networking accounts so you can add effects to them. The interface is pretty neat with a plethora of effects that one can play around with. There are various other applications like picplz and many more. With these applications you can accentuate your photography experience.

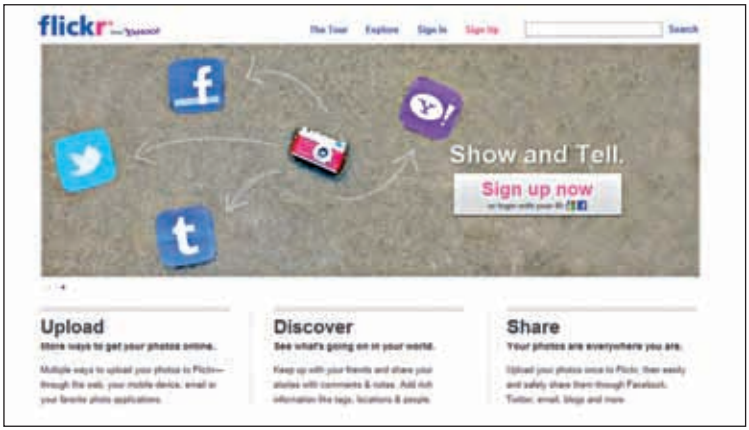
So, next time when you decide to buy a camera phone you should look for the above features. Make the most of your smart camera phones.

ONLINE RESOURCES

After understanding dSLRs and helping you capture those wondrous photographs in other ways, we now see how you can share and preserve your collection

Photographs express a gamut of feelings. They say a thousand words and keep the memories alive. It is always a pleasure to look at the photos and live the bygone moments even after a decade. However, lovely memories are best cherished when they are shared by the loved ones. Prior to the advent of the digital age, the most popular means of photo-sharing was to take double or triple prints and either mail them or give them to the person we wanted to share with. But then, this was not only expensive but also time-consuming.

The dawn of the digital age and Internet boom has been instrumental in easing out the photo online sharing methods. In the present era the free online photo-sharing web sites available have made things hassle free. Web



The most popular destination for high quality photographs

photo-sharing allows you to upload and organise your pictures online; to share them with friends, family and other keen photographers; to receive feedback, tips and ideas; to enter competitions; to gain exposure for your portfolio, and so much more.

In our experience the most sought after online photo-sharing web site is **Flickr.** A Yahoo owned portal, Flickr is the reigning online photo-sharing web site in terms of popularity, features and audience. It soon surfaced as an online photo-sharing web site with a bustling community. It is clear, unfussy and easy to use. It is free to create an account with 100MB of storage space available to fill each month. There are a vast number of photos on Flickr and thousands of groups, galleries, discussions and so on. People are very eager to share feedback with each other and congratulate someone when they have produced a good shot. You can organise your photos into sets, create galleries or 'favourites' collections of your favourite pictures by other people, and even upload video footage. Even though this portal offers limited space and often users are pressed to pay for unlimited accounts, Flickr users are increasing every day in leaps and bounds.

The next most famous photo-sharing web site is **Picasa Web Albums.** It is a photo-sharing web site from Google. It allows users with accounts at Google to store and share 1 GB of large photos for free. Storage is unlimited for photos 2048x2048 pixels or smaller for Google+ users, and for photos 800x800 for everyone else. Videos less than 15 minutes long also don't count towards the limit. After the limit is reached, photos are automatically

resized. Unlike Flickr, it uses an "unlisted number" approach for URLs for private photo albums. This enables a user to email a private album's URL to anyone, and the recipient can view the album without having to create a user account. This is done via an "authentication key" that must be appended to the URL for the album to be shown.

The other prominent contender to the title of the trendy online photo-sharing web site is **Photobucket**. Before the advent of the Flickr era, this was the most popular web site for hassle free photo-sharing. It was the most recognised image hosting portal for online community forums and blogging sites such as MySpace, etc. Being the favourite among the younger generation, one can create and share albums, devise slide shows and share them too. Of late, this site has attracted ouRecently, Photobucket has teamed with Twitter to be able to upload and host images.

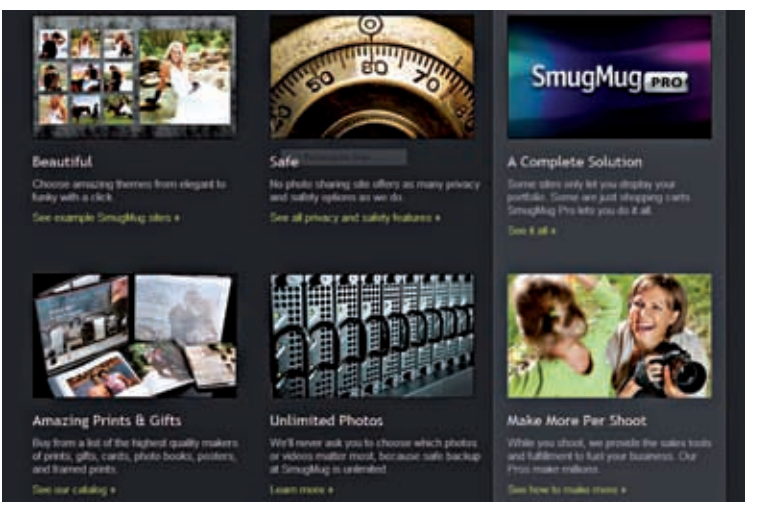
The next photo-sharing web site that we would like to highlight upon is **Shutterfly.** It is very popular among university and college forums. . This web site allows you to upload, edit, mail-to-order and even print photos. However, the reason behind its popularity among student forums is the unique feature of the portal allowing teams and groups to share and even use photos on several other web sites. Shutterfly has recently integrated it award winning Simple Path photo book creator service with Facebook allowing its four hundred million users an easy access to transform mere

Print your photos online

photographs into lifetime memories. The service allows users to not only pull from their Facebook photos, but also from friends' Facebook albums, tagged photos and mobile uploads. One of the more interesting aspects to the new service is that it takes into consideration for Facebook's lower resolution images. As a result, Shutterfly will automatically detect image size and chooses the optimal layout for each photo in the book.

For professional photographers the most sought after web site is **Smugmug**. Though a paid photo-sharing web site, it has gained popularity among the professionals because of its attractive and user-friendly interface which turns it into one of the trendiest portals in the true sense. Smugmug is definitely one of the top photo-sharing sites for those of you interested in selling your work. There are three account types: Standard, Power and Pro. The latter two actually enable you to customise the look and feel of your area on Smugmug, whilst Pro gives you the option to place images up for sale. All accounts have unlimited storage. When selling images from Smugmug you can easily apply a watermark to the previews, to prevent copyright violation and set the prices yourself. So you create a cool photo-sharing gallery, as well as a little business. Lots of photographers choose to use Smugmug as an outlet.

Another amazing online photo-sharing portal is **Trek Earth**. They aim to learn about the world using photography. It is portal for travel photogra-



Pro photography exhibition

Travel + photography = learning

phers. Trek Earth is a web site entirely dedicated to engage people interested in photography around to world to become one promising community. Members are motivated to take captivating earth photos from where they belong and are allowed to upload as well as by using an encouraging critique system they can comment on each other's photography. In addition to uploading their own images and critiquing those of others, members can upload post-processed workshop images. The site also contains forums covering topics ranging from tips and techniques to note-writing.

For photographers who are looking for some serious learning **Photo.net** is a very useful web site. It is web site for those who wish to connect with other photographers, explore photo galleries, discuss photography, share and critique photos, and learn about photography. Began in 1993 as

Philip Greenspun's personal home page at MIT, it has grown to become a community of photographers that includes more than 800,000 registered users working to help each other improve.

Fotki is a free photo-sharing site with 1,000MB of free storage space. An active and vibrant community provides a great place to share photos, or videos, and receive feedback on your work. It is a thriving online community of photo fans who share their work online. It offers both low-cost and easy way to share your photos as well as printing service too. Fotki has a very easy-to-use interface, fully automated Really Simple Syndication (RSS) feeds so that you can tie your pictures to your blog, and "communities" or like-minded folks. Fotki's streamlined interface makes browsing through public photo albums easy and addictive. It gives you a plethora of photo management tools. You can create online photo albums with unlimited storage. Share your photos with friends and family or the world, create public and private photo albums, order high quality photo prints at very low price, protect your folders and albums with password and read comments about photos and guest book messages that your friends have left. There is an interesting commercial dimension to Fotki. If you wish to convert the exposure gained through your Fotki portfolio into an opportunity for income, it is possible (and simple) to place images for sale as prints, cards or other photo gifts. (How to sell photos online). You can also use their printing service to order your own images as prints, canvases and so on. A 'Premium' membership upgrade costs $27/year and brings unlimited storage space.

Even though we have managed to elaborate about a few of the many web sites available for online photo-sharing, you can always create your own unique web site for photo-sharing. It does sound daunting but there are photography web sites templates available. You can tailor the design to your own personal taste, put up galleries of your work and even make a few sales!

So what are you waiting for get registered with one of the above mentioned web sites , upload your photos and start sharing!

thinkdigit.com

thinkdigit.com

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